

**Program Topic: Introduction to Program Management**

Syllabus Topic: 9.1 Project Management

**HSC Week 1**

Davis Text: p3-19, Exercise 1A

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher introduces Project Management including the project triangle to reinforce the purpose of project management and the general nature of project management tasks during system development.	* communication skills necessary for dealing with others	* understand the communication skills required to manage a system development project, such as:
Students in groups discuss the differences between information system development compared to other product development. (Group task p4).	* the consequences for groups that fail to function as a team, including: – financial loss – employment loss – missed opportunities	– active listening – conflict resolution – negotiation skills – interview techniques – team building
Whole class discussion of roles and problems encountered during the above Group Task as an introduction to communication skills and teams.	* project management tools, including:	* understand the need to apply project management tools to develop a system using a team approach
Students split into pairs to read about active listening and then role play active listening. (Group Task p7).	– Gantt charts	* appreciate the advantages of groups that function as a team, including:
Students in small groups identify causes of conflict and suitable resolution strategies. (Group Task p8).	– scheduling of tasks	– increased productivity
Students in small groups identify negotiation issues, parties and techniques. (Group Task p10).	– journals and diaries	– enhanced job satisfaction
Whole class discussion reflecting on interviews where students were the interviewee. Consider positive and negative attributes. (Group Task p11).	– funding management plan	– the development of a quality system
Students in small groups discuss advantages of teams and disadvantages of groups that do not function as teams. (Include Group Task p12).	– communication management plan	* appreciate the need for complete documentation throughout all aspects of the system
Students in small groups reflect on how teams are formed. (Including Group Task p13). Students identify Belbin team roles that apply to them and others comment. (Group Task p14). Groups then research using Internet to find alternatives to the Belbin model that are in use. (Group Task p14).	* identifying social and ethical issues	* assess the social and ethical implications of the solution throughout the project
Students write summaries of Project Management Tools including (but not limited to) Gantt charts, journals and diaries, funding management plans and communication management plans. (p15-Group Task p18).		
Students in small groups discuss social and ethical issues related to project management. (Including Group Tasks p18).		
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**Program Topic: Introduction to System Development, Understanding the Problem**

**HSC Week 2**

Syllabus Topic: 9.1 Project Management

Davis Text: p21-44, Exercise 1B

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher introduces the traditional approach and briefly outlines alternative approaches. Including discussion why the traditional approach is often less suited to information system development. (Includes Group Tasks p21 and 22).	* approaches to identify problems with existing systems, including: – interviewing/surveying users of the information system – interviewing/surveying participants – analysing the existing system by determining: - how it works - what it does - who uses it  * requirements reports  * requirements prototype – a working model of an information system, built in order to understand the requirements of the system – used when the problem is not easily understood – repetitive process of prototype modification and participants' feedback until the problem is understood – can be the basis for further system development	* apply appropriate techniques in understanding the problem
Whole class discussion of different version of the traditional approach and their similarities (and differences) compared to the IPT version. (Group Tasks p23).		* interpret a requirements report which includes: – the purpose of the systems – an analysis of an existing system – definition of extra requirements
Teacher outlines tasks and deliverables for each stage of the IPT system development lifecycle. (Group Task p24).		* diagrammatically represent existing systems using context diagrams and data flow diagrams
Whole class discussion to introduce Pet Buddies scenario. (Group Tasks p25).		* identify, communicate with and involve participants of the current system
Teacher outlines Understanding the Problem stage. (Includes Group Tasks p26,27).		* create a requirements prototype from applications packages that provide: – screen generators – report generators
Students in small groups read information on interviewing/surveying users/participants of existing system and complete Group Tasks (p27-33). Whole class summary session to share results.		* use a prototype to clarify participants' understanding of the problem
Class discussion on the nature and role of requirements prototypes. How they assist development personnel (Group Task p35).		
Students create a simple (single screen) requirements prototype using a screen generator. Screen could developed from an existing paper form, such as a question from a Centrelink or other government department's paper application form.		
Teacher describes the purpose and content of a requirements report and how it is used throughout the SDLC. (includes Group Tasks p36-39).		
Teacher demonstrates an automated requirements definition application, such as Objectiver. (Group Task p40) Students then research other examples of requirements engineering software (Group Task p40).		
Students in small groups analyse the example pages from the Pet Buddies requirements report on p41-42. (Group Tasks p41,42).		
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**Program Topic: Planning**

Syllabus Topic: 9.1 Project Management

**HSC Week 3**

Davis Text: p46-62, Exercise 1C

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher introduces Planning stage, including processes and deliverables.	* a feasibility study of proposed solutions, including:	* conduct a feasibility study and report on the benefits, costs and risks of the project
Students in small groups read and discuss feasibility studies, including Pet Buddies example. (p46-52 including Group Tasks).	– economic feasibility	* compare traditional, iterative and agile system development approaches
Teacher presents different system development approaches including advantages/disadvantages and suitable example systems for each approach. Includes Group Tasks p54-59).	– technical feasibility	* create Gantt charts to show the implementation time frame
Students individually summarise section "Determine how the project will be managed and update the requirements report" (p59-61) and complete Group Tasks (p61). Create a Gantt chart for Pet Buddies system development.	– operational feasibility	* investigate/research new information technologies that could form part of the system
	– scheduling	
	* choosing the most appropriate solution	
	* choosing the appropriate development approaches	
	– traditional	
	– outsourcing	
	– prototyping	
	– customisation	
	– participant development	
	– agile methods	
	* the requirements report that:	
	– details the time frame	
	– details the subprojects and the time frame for them	
	– identifies participants	
	– identifies relevant information technology	
	– identifies data/information	
	– identifies the needs of users	
	* participant development, when people within the information system develop the solution	
	– participant designed solutions	
	– tools for participant development such as guided processes in application packages	

**Program Topic: Designing**

Syllabus Topic: 9.1 Project Management

**HSC Week 4**

Davis Text: p64-81, Exercise 1D

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher outlines activities occurring during the Designing stage of the SDLC. This includes differences as a consequence of the selected system development approach and how user/participant needs/concerns will be determined/addressed.	* clarifying with users the benefits of the new information system	* develop a solution to a problem from a prototype
Teacher presents context diagrams, including symbols and strategy for creation using example questions. (Includes Group Task p66).	* designing the information system for ease of maintenance	* use a guided process in an application to create all or part of a solution
Students create context diagrams by answering Exercise 1D Question 13.	* clarifying each of the relevant information processes within the system	* use system design tools to: – better understand the system – assist in explaining the operation of the new system – document the new system
Teacher presents Data Dictionaries including all columns within the Course Specifications (Refer p14 of Course Specifications). Note that some columns are not relevant to current study of design tools, but will be relevant to database design. (Include Group Tasks p67).	* detailing the role of the participants, the data and the information technology used in the system	
Students create a data dictionary for the Context Diagrams created in Exercise 1D Q13.	* refining existing prototypes	
Teacher presents DFDs including the symbols used, rules, levels and creation strategy. Refer to Widget examples on page 69 and Pet Buddies example on page 70. (Includes Group Tasks p69,71).	* tools used in designing, including: – context diagrams – data flow diagrams – decision trees – decision tables – data dictionaries – storyboards	
Students in small groups complete Exercise 1D Q14 (a) and (b). Each group in turn shares their DFD with the class. Class critically analyses each DFD.		
Teacher presents Decision Trees and Decision Tables using (and creating) examples.		
Students in groups identify conditions and actions for the ATO tables on page 72 and create a decision table or tree. As a class, analyse each group's result and compare to the solutions on page 30 of the IPT HSC TRK.		
Teacher introduces Storyboards, including the example within the Course Specifications (page 15).		
Students in small groups are allocated an application or website. Each group creates a storyboard, including links, based on their allocated application or website and comments on strengths and weaknesses of the design.		
Teacher outlines factors related to the design of hardware and software (Information Technology). Includes Group Tasks p75-78.		
Students identify issues associated with the refinement and distribution of prototypes and strategies for obtaining ongoing user feedback. (Group Task p80).		
Students use a guided process (such as a Wizard) to build part of a system. Possible examples are listed at the bottom of page 80.		
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**Program Topic: Implementing**

Syllabus Topic: 9.1 Project Management

**HSC Week 5**

Davis Text: p84-89

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher outlines the activities performed during the implementation stage. Including the importance of correct sequencing and scheduling detailed within an implementation plan. (Includes Group Tasks p84,85).	* acquiring information technology and making it operational – hardware – software, customised or developed	* determine training needs arising from the creation of a new system * compare and contrast conversion methods
Students summarise the four methods of conversion and understand a combination of methods is common. Includes Group Task p87.	* an implementation plan that details: – participant training – the method for conversion - parallel conversion - direct conversion - phased conversion - pilot conversion	* justify the selected conversion method for a given situation * convert from the old system to the new
Students understand the use, effectiveness and role of different training methods, such as face-to-face training, online training and operation manuals. Read "Implementing Training for participants and users" (p87-89), including student completion of Group Tasks.	– how the system will be tested – conversion of data for the new system * the need for an operation manual detailing procedures participants follow when using the new system	* implement the appropriate information technology * develop an implementation plan for the project

**Program Topic: Testing, Evaluating and Maintaining**

**HSC Week 5**

Syllabus Topic: 9.1 Project Management

Davis Text: p90-101, Exercise 1E, Chapter 1 Review

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher introduces testing and evaluation. Includes distinguishing between and describing the purpose of volume, simulated and live tests. Also reinforcing and identifying when and why testing/evaluation occurs throughout the SDLC. (Includes Group Tasks p90,92).	* testing and evaluating the solution with test data such as – volume data – simulated data – live data	* compare the new system to the old and evaluate whether the requirements have been met * update system documentation
Students use a volume test data generator to populate a simple prepared database, such as an address book.	* checking to see that the original system requirements have been achieved	
Students understand that operation manuals are specific to the individual system/organisation and reasons for trialing operation manuals. Students read pages 93,94 and complete Group Tasks on page 94.	* trialling and using the operation manual	
Students understand the need for and variety of ongoing evaluation. Students read and summarise pages 95-98 and respond to the included Group Tasks on p95,98.	* reviewing the effect on users of the information system, participants and people within the environment	
Teacher introduces common maintenance activities using a variety of existing known systems as examples. For instance maintenance of school network, library, banks, mobile phone, email systems, etc.	* modifying parts of the system where problems are identified	
Students understand that ongoing evaluation/maintenance tasks often uncover areas that require modification. Modifications should follow the stages of the SDLC. Students complete Group Tasks p99.		

**Program Topic: Examples of Information Systems and Databases**

**HSC Week 6**

Syllabus Topic: 9.2 Information Systems and Databases

Davis Text: p107-117, Exercise 2A

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher introduces information systems and databases, including examples to illustrate their widespread usage within a broad range of information systems. For example banks, search engines, CMS, LMS, and virtually every business and government organisation. (Includes Group Tasks p107).	<ul style="list-style-type: none"> <li>* the characteristics of an information system, namely:                             <ul style="list-style-type: none"> <li>– the organisation of data into information</li> <li>– the analysing of information to give knowledge</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* identify the type and purpose of a given information system</li> </ul>
Students study the school timetable system described in the text (p108-112) and complete the included Group Tasks. Students compare the example in the text to the timetable system within the school.	<ul style="list-style-type: none"> <li>* the different types of and purposes for information systems, including systems used to:                             <ul style="list-style-type: none"> <li>– process transactions</li> <li>– provide users with information about an organisation</li> <li>– help decision-making</li> <li>– manage information used within an organisation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* represent an information system using a systems representation tool                             <ul style="list-style-type: none"> <li>– identify the purpose, information processes, information technology and participants within a given system</li> <li>– represent diagrammatically the flow of information within an information system</li> </ul> </li> </ul>
Students study the RTA system described within the text (p113-115) and complete the included Group Tasks.	<ul style="list-style-type: none"> <li>* school databases holding information on teachers, subjects, classrooms and students</li> </ul>	<ul style="list-style-type: none"> <li>* identify participants, data/information and information technology for the given examples of database information systems</li> </ul>
Students study the Video Store information system described as part of the HSC Style Question (p116-117) and complete the included Group Tasks. Based on the suggested solution, students create a context diagram and create a procedure (sequence of steps) for sales staff as when processing sales.	<ul style="list-style-type: none"> <li>* the Roads and Traffic Authority holding information on automobiles and holders of drivers licences</li> </ul>	<ul style="list-style-type: none"> <li>* describe the relationships between participants, data/information and information technology for the given examples of database information systems</li> </ul>
	<ul style="list-style-type: none"> <li>* video stores holding information on borrowers and videos</li> </ul>	

**Program Topic: Flat File Databases****HSC Week 7**

Syllabus Topic: 9.2 Information Systems and Databases

Davis Text: p119-125, Exercise 2B

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher introduces the organisation of flat-file, relational databases and hypermedia, including demonstration of actual examples and the importance of privacy, security and accuracy of data.	<ul style="list-style-type: none"> <li>* non-computer methods of organising including:               <ul style="list-style-type: none"> <li>– telephone books</li> <li>– card based applications</li> </ul> </li> </ul>	* choose between a computer based or non-computer based method to organise data, given a particular set of circumstances
Teacher introduces the data types available within the DBMS that will be used and describes examples of attributes appropriate to each data type. Refer pages 121-123, including Group Tasks p123.	<ul style="list-style-type: none"> <li>* computer based methods of organising, including:               <ul style="list-style-type: none"> <li>– flat-file systems</li> <li>– database management systems</li> <li>– hypermedia</li> </ul> </li> </ul>	* identify situations where one type of database is more appropriate than another
Students create and populate a flat-file database for a situation (in the form of a single table using a relational DBMS). For example, an address book or for recording their assessment task due dates and results. The focus at this time is on using appropriate data types, however this flat-file could be retained and normalised later in this topic.	* the advantages and disadvantages of computer based and non-computer based organisation methods	* create a data dictionary for a given set of data
Students in small groups read about non-computer flat-files, brainstorm examples and appreciate their advantages and disadvantages. (Includes Group Tasks p125).	<ul style="list-style-type: none"> <li>* the logical organisation of flat-file databases, including:               <ul style="list-style-type: none"> <li>– files</li> <li>– records</li> <li>– fields, key fields</li> <li>– characters</li> </ul> </li> </ul>	* demonstrate an awareness of issues of privacy, security and accuracy in handling data
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**Program Topic: Relational Databases**

Syllabus Topic: 9.2 Information Systems and Databases

**HSC Week 8**

Davis Text: p127-137, Exercise 2C

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher briefly outlines the general organisation of network, hierarchical and relational databases to illustrate alternative methods of organisation. (Refer first Group Task p127). Teacher provides multiple examples of systems where relational databases are critical. (Refer second Group Task p127)	* the logical organisation of relational databases, including: – schemas as consisting of: - entities - attributes	* identify situations where one type of database is more appropriate than another * represent an existing relational database in a schematic diagram
Teacher demonstrates the relationship between applications, DBMS and relational databases using an actual example. For instance, using the school's admin system, CMS or LMS where access to the underlying relational DBMS is possible.	- relationships * one to one * one to many * many to many	* create a schematic diagram for a scenario where the data is to be organised into a relational database * modify an existing schema to meet a change in user requirements
Teacher guides and stops to formally present relational databases and schemas to students whilst they explore the organisation of the completed Library database described in the text. Refer pages 128-136 and complete the included Group Tasks.	– tables as the implementation of entities consisting of: - attributes - records	* choose and justify the most appropriate type of database, flat-file or relational, to organise a given set of data
Students recreate the Library database from scratch based on the revised schema (Fig 2.17 p133).	– linking tables using primary and foreign keys – user views for different purposes	* create a simple relational database from a schematic diagram and data dictionary
	* data modelling tools for organising databases, including: – data dictionaries to describe the characteristics of data including: - field name - data type - data format - field size - description - example – schematic diagrams that show the relationships between entities – normalising data to reduce data redundancy	* populate a relational database with data * describe the similarities and differences between flat-file and relational databases * create a data dictionary for a given set of data * create documentation, including data modelling, to indicate how a relational database has been used to organise data
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**Program Topic: Normalising Databases**

Syllabus Topic: 9.2 Information Systems and Databases

**HSC Week 8**

Davis Text: p139-148, Exercise 2D

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher describes the purpose of normalisation and outlines the normalisation process and normal forms. Includes Group Task p139.	* data modelling tools for organising databases, including:	* create a schematic diagram for a scenario where the data is to be organised into a relational database
Teacher formally presents normalising to 1NF and demonstrates using the initial Invoicing database within the text. Including Group Task p141.	– data dictionaries to describe the characteristics of data including:	* modify an existing schema to meet a change in user requirements
Students normalise the initial Invoicing database to 1NF.	- field name	* create a simple relational database from a schematic diagram and data dictionary
Teacher formally presents normalising from 1NF to 2NF and demonstrates beginning with the 1NF Invoicing database within the text.	- data type	* populate a relational database with data
Students normalise the 1NF Invoicing database to 2NF.	- data format	* create documentation, including data modelling, to indicate how a relational database has been used to organise data
Teacher formally presents normalising from 2NF to 3NF and demonstrates an example using the 2NF Invoicing database within the text. Includes Group Task p145.	- field size	
Teacher leads discussion of advantages of normalised databases. Based on "Consider the following" p145,146. Includes Group Tasks p146.	- description	
Students create and populate the relational database for the HSC Style Question and Suggested Solution p147,148. Includes Group Tasks p148.	- example	
	– schematic diagrams that show the relationships between entities	
Information Processes and Technology Program (page 10 of 48)	– normalising data to reduce data redundancy	
	Class: _____ Teacher: _____ Date Completed: _____	

**Program Topic: Hypertext, Hypermedia**

Syllabus Topic: 9.2 Information Systems and Databases

**HSC Week 9**

Davis Text: p150-160, Exercise 2E

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher introduces the terms hypermedia and hypertext, including its organisation (nodes and links) and its broader meaning (not just HTML). Refer p150-151 including Group Tasks.	<ul style="list-style-type: none"> <li>* the logical organisation of hypermedia, including:               <ul style="list-style-type: none"> <li>– nodes and links</li> <li>– uniform resource locators</li> <li>– metadata such as HTML tags</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* compare and contrast hypermedia and databases for organising data</li> <li>* design and develop a storyboard to represent a set of data items and links between them</li> </ul>
Students in small groups investigate a variety of different hypermedia systems. For example, games, education and help systems. Examples should not be limited to websites. Students analyse the screen layout and navigation with particular focus on how this assists the system to achieve it's purpose.	<ul style="list-style-type: none"> <li>* tools for organising hypermedia, including:               <ul style="list-style-type: none"> <li>– storyboards to represent data organised using hyperlinks</li> <li>– software that allows text, graphics and sounds to be hyperlinked</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>* construct a hypertext document from a storyboard</li> <li>* use software that links data, such as:               <ul style="list-style-type: none"> <li>– HTML editors</li> <li>– web page creation software</li> </ul> </li> </ul>
Students create a storyboard for a simple hypertext/hypermedia system that is appropriate for implementation using basic HTML.	Teacher presents examples of HTML code, defines the term metadata and describes the components of URLs.	
Teacher presents examples of HTML code, defines the term metadata and describes the components of URLs.	Students use a text editor to write HTML code to create a simple web containing 3 or 4 screens. The web should include text, images and videos.	
Students use a text editor to write HTML code to create a simple web containing 3 or 4 screens. The web should include text, images and videos.	Students use a web page creation application to create a simple web based on an existing template.	
Students use a web page creation application to create a simple web based on an existing template.		
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**Program Topic: Storage and Retrieval**

Syllabus Topic: 9.2 Information Systems and Databases

**HSC Week 10**

Davis Text: p162-176, Exercise 2F

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>
Teacher describes the operation and role of DBMS software in relation to applications and databases. Refer p162-164 and included Group Tasks.	<ul style="list-style-type: none"> <li>* database management systems (DBMS) including:               <ul style="list-style-type: none"> <li>– the role of a DBMS in handling access to a database</li> <li>– the independence of data from the DBMS</li> </ul> </li> </ul>
Students summarise text information on storage hardware and define syllabus terms. Refer p164-169, includes Group Tasks.	* direct and sequential access of data
Students in small groups are assigned one of the techniques for securing data from Fig 2.57 on page 170. Each group reads and researches their technique and plans a 5-10 minute presentation.	* on-line and off-line storage
Each group of students presents their technique for securing data to the class. Teacher adds any missing details as required after each presentation.	<ul style="list-style-type: none"> <li>* storage media including:               <ul style="list-style-type: none"> <li>– hard discs</li> <li>– CD-ROMs</li> <li>– cartridge and tape</li> </ul> </li> </ul>
Teacher directs class discussion of suitable security measures (including combination of measures) using a variety of scenarios. (Group Task bottom of p176).	* encryption and decryption
	* backup and security procedures

**Program Topic: Searching, Selecting, Sorting**

Syllabus Topic: 9.2 Information Systems and Databases

**HSC Week 10**

Davis Text: p178-190, Exercise 2G

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher introduces SQL searching and sorting. Includes detail of alphanumeric versus numeric sorts and the role of indexes.	* tools for database storage and retrieval, including: – extracting relevant information through searching and sorting a database – selecting data from a relational database using Query by Example (QBE) and Structured Query Languages (SQL) commands, including: - select - from - where - order by	* search a database using relational and logical operators
Students work through p179-189 in conjunction with the sample databases included within the related TRK (or created from the images within the text). Students should create the SQL and confirm the results within the text.		* output sorted data from a database
Teacher describes their actions as they create Mia's relational database detailed in the HSC Style Question (p190). Use MySQL or SQL Server for this task.		* generate reports from a database
Each student uses MS-Access to attach to the Mia database and add a number of records.		* construct an SQL query to select data from a given database, matching given criteria
Teacher directs students to perform particular searches and sorts using the Mia database. Students enter queries via MS-Access with the teacher confirming the results using the MySQL command line.		* calculate the storage requirements for a given number of records (given a data dictionary for a database)

**Program Topic: Centralised and Distributed Databases**

Syllabus Topic: 9.2 Information Systems and Databases

**HSC Week 11**

Davis Text: p192-197

**Teaching and Learning Strategies:**

Teacher presents centralised and distributed databases, including a range of common distributed database strategies (p192-197). Includes Group Tasks p197).

**Students Learn About:**

\* centralised and distributed databases

**Program Topic: Search Engines**

Syllabus Topic: 9.2 Information Systems and Databases

**HSC Week 11**

Davis Text: p197-201, Exercise 2H

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Students are assigned a search engine, they research the operation of this search engine. Include examples of web directories and those that use search robots or crawlers.	* tools for hypermedia search and retrieval, including: – free text searching – operation of a search engine - indexing and search robots - metadata	* summarise, extrapolate and report on data retrieved from the Internet
Teacher presents the detailed operation of the search engine described in the text (p198-201). Including comparison with the operation of search engines researched by students.		* use search engines to locate data on the World Wide Web
Class discussion of how to improve ranking of individual search results. (Group Tasks p201).	* reporting on data found in hypermedia systems	* describe the principles of the operation of a search engine

**Program Topic: Collecting and Displaying for Database Systems**

**HSC Week 12**

Syllabus Topic: 9.2 Information Systems and Databases

Davis Text: p203-213, Exercise 21

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher presents and evaluates examples of data entry screens and reports to illustrate aspects of good and poor design (Refer p204-212).	* displaying – reporting on relevant information held in a database	* design and create screens for interacting with selected parts of a database and justify their appropriateness
Teacher demonstrates the operation and features of the form and report design tools in the software to be used to complete the practical tasks that follow.	– constructing different views of a database for different purposes	* design and generate reports from a database
Students design and create data entry screens for an existing database using the design principles described in the text (p204-212).		
Students design and create reports (for printing) from an existing database using the design principles described in the text (p204-212).		

**Program Topic: Issues Related to Information Systems and Databases**

**HSC Week 12**

Syllabus Topic: 9.2 Information Systems and Databases

Davis Text: p215-224, Exercise 2J, Chapter 2 Review

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
<p>Teacher leads discussion on the reasons for acknowledging data sources. Including justifying and verifying outputs, auditing and tracking the accuracy of data and complying with requirements of the data source organisation/individual. (Includes Group Tasks p25, 216).</p>	<ul style="list-style-type: none"> <li>* acknowledgment of data sources</li> <li>* the Freedom of Information Act</li> <li>* privacy principles</li> <li>* quality of data</li> </ul>	<ul style="list-style-type: none"> <li>* identify and apply issues of ownership, accuracy, data quality, security and privacy of information, data matching</li> <li>* discuss issues of access to and control of information</li> </ul>
<p>Class discussion of Freedom of Information and Privacy legislation. Focus on what is covered, reasons for the legislation and also how it can be enforced. Refer text p26-219 (Including Group Tasks).</p>	<ul style="list-style-type: none"> <li>* accuracy of data and the reliability of data sources</li> <li>* access to data, ownership and control of data</li> </ul>	<ul style="list-style-type: none"> <li>* validate information retrieved from the Internet</li> </ul>
<p>Class discussion of the importance of data integrity, including validation and verification (p219, 220). Also data quality, refer p443 of TPS chapter.</p>	<ul style="list-style-type: none"> <li>* data matching to cross link data across multiple databases</li> </ul>	
<p>Teacher outlines the general nature of data warehouses, data mining (refer text p222-223 and also 435,468-472), OLAP and OLTP (refer text p224, 472-475).</p>	<ul style="list-style-type: none"> <li>* current and emerging trends in the organisation, processing, storage and retrieval of data, such as:                             <ul style="list-style-type: none"> <li>– data warehousing and data mining</li> <li>– Online Analytical Processing (OLAP) and Online Transaction Processing (OLTP)</li> </ul> </li> </ul>	
<p>Students research examples of organisations that use data warehouses and determine how they are mined. They also use a simple online OLAP tool using the Internet. (If not studying TPS and DSS then this is particularly critical).</p>		

**Program Topic: Communication System Framework**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 13**

Davis Text: p229-237

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
<p>Teacher presents the Communication System Framework diagram using non-computer (e.g. conversation) and simplified computer examples. (p229 and Group Task p229).</p>	<p>* communication systems as being those systems which enable users to send and receive data and information</p>	<p>* use applications to create and transmit messages</p>
<p>Teacher outlines both the OSI model layers and IPT levels of protocols. Includes identifying common protocols operating at each of the IPT Levels. (p230-231)</p>	<p>* the framework in which communication systems function, demonstrated by the following model</p>	<p>* establish a communications link and describe the steps that take place in its establishment</p>
<p>Teacher presents how messages pass from sender to receiver. A web browser retrieving then displaying a particular single HTML page would be a good example to use as the class works through pages 232-237 of the text. Teacher demonstrates the processes performed by each protocol using command line tools. For example, perform an HTTP GET, DNS lookup, TRACERT, netstat and examine MAC addresses of devices as different parts of the exchange are described.</p>	<p>* the functions performed within the communication systems in passing messages between source and destination, including:</p> <ul style="list-style-type: none"> <li>- message creation</li> <li>- organisation of packets at the interface between source and transmitter</li> <li>- signal generation by the transmitter</li> <li>- transmission</li> <li>- synchronising the exchange</li> <li>- addressing and routing</li> <li>- error detection and correction</li> <li>- security and management</li> </ul>	<p>* identify and describe specified protocols at different stages of the communication</p>
	<p>* the roles of protocols in communication</p> <ul style="list-style-type: none"> <li>- handshaking and its importance in a communications link</li> <li>- functions performed by protocols at different levels</li> </ul>	

**Program Topic: Protocols**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 13**

Davis Text: p237-244, Exercise 3A

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Students individually read through introduction to protocols and HTTP on pages 237-239.	* the roles of protocols in communication – handshaking and its importance in a communications link	* use applications to create and transmit messages
Students use telnet (or similar) to execute HTTP commands directly. Students view a simple HTML file using a browser and then the same file using telnet.	– functions performed by protocols at different levels	* establish a communications link and describe the steps that take place in its establishment
Students study TCP and IP on pages 239-243.	* communication protocols, including:	* identify and describe specified protocols at different stages of the communication
Students investigate and track the route of an actual TCP/IP exchange using command line tools. For example, ping, Tracert, nslookup, etc.	– application level protocols - http	* use a communication system to transmit and receive audio, video and text data
Students study the Ethernet protocol on pages 243-244.	- smtp	* justify the need to encode and decode data
Students investigate the Ethernet standard used within the classroom. Students identify MAC (physical) addresses of NICs and connection devices.	- SSL	* describe the structure of a data packet
	– communication control and addressing level protocols - TCP	
	- IP	
	– transmission level protocols - Ethernet	
	- Token ring	
	* processing, including:	
	– encoding and decoding analog and digital signals	
	– formation of data packets	
	– routing	
	– encryption and decryption	
	– error checking - parity bit check	
	- check sum	
	- cyclic redundancy check (CRC)	
Information Processes and Technology Program (page 19 of 48)	Class: _____ Teacher: _____	Date Completed: _____

**Program Topic: Measurements of Speed**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 14**

Davis Text: p246-249

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher presents the terms bps, Baud rate and bandwidth. (Refer p246-249). Includes detail of modulation schemes such as QAM.	* characteristics of media in terms of speed, capacity, cost and security	* justify the need to encode and decode data
Class discussion of factors affecting transmissions times. Includes Group Tasks on p247 and p249.	* processing, including: <ul style="list-style-type: none"><li>- encoding and decoding analog and digital signals</li><li>- formation of data packets</li><li>- routing</li><li>- encryption and decryption</li><li>- error checking</li><li>- parity bit check</li><li>- check sum</li><li>- cyclic redundancy check (CRC)</li></ul>	* identify where in a communication system signal conversion takes place

**Program Topic: Error Checking Methods**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 14**

Davis Text: p249-258, Exercise 3B

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher presents the operation of parity bit checks using simple examples of odd and even parity. Teacher explains applications that use parity bits and the limitations of parity checks compared to other error checking methods. (Refer p249-250).	* strategies for error detection and error correction	* describe methods to check the accuracy of data being transmitted
Students calculate the value of parity bits for a number of given examples. Students analyse different types of corruption that will and will not be detected by parity checks.	* processing, including: <ul style="list-style-type: none"> <li>- encoding and decoding analog and digital signals</li> <li>- formation of data packets</li> <li>- routing</li> <li>- encryption and decryption</li> <li>- error checking</li> <li>- parity bit check</li> <li>- check sum</li> <li>- cyclic redundancy check (CRC)</li> </ul>	
Teacher introduces checksums using an example calculated in both decimal and binary. (Refer p251-253). Teacher identifies protocols that include checksums.		
Students calculate checksums in both decimal and binary using a limited number of 8-bit numbers. Whilst working, students attempt to identify corruptions that would not be detected using checksums.		
Teacher presents the operation of CRCs using a numeric example. (refer p253-256). Teacher identifies applications (mostly hardware) that utilise CRCs.		
Students calculate CRC values for given simple examples. Students identify the general nature of corruptions that would not be detected using CRCs.		

**Program Topic: Teleconferencing**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 15**

Davis Text: p260-273, Exercise 3C

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher outlines the differences between the Internet, PSTN, intranets and extranets. Including limitations of each and how the underlying digital infrastructure is often shared.	* teleconferencing systems	* use a communication system to transmit and receive audio, video and text data
Students in small groups work through the two example teleconferencing systems outlined in the text. Each group discusses and compiles written responses to each of the included group tasks. (Refer p261-272).	* similarities and differences between the Internet, intranets and extranets	* for given examples, identify the participants, information/data, information technology, need and purpose
Students participate in a brief teleconference (including initial setup) within the classroom using available technology. Class discussion outlining the difficulties encountered during setup and during the conference.	* changing nature of work	* for given examples explain how data is transmitted and received
		* for given examples, identify the advantages and disadvantages of the system
		* compare and contrast traditional communication systems with current electronic methods
		* represent a communication system diagrammatically
		* identify the issues associated with the use of communication systems, including: – teleconferencing systems – messaging systems – e-commerce – EFTPOS – electronic banking
Information Processes and Technology Program (page 22 of 48)	Class: _____ Teacher: _____ Date Completed: _____	

**Program Topic: Messaging Systems**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 15**

Davis Text: p275-284

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Class discussion of the operation of traditional telephone/fax and advantages/disadvantages over other computer-based means of communication. (refer p275-276).	* messaging systems, including: – email – voice mail – Voice Over Internet Protocol (VOIP)	* use a communication system to transmit and receive audio, video and text data
Students study voice mail and phone information systems (p276-282, including Group Tasks).	* collecting, such as – the phone as the collection device with voice mail – EFTPOS terminal as a collection device for electronic banking	* for given examples, identify the participants, information/data, information technology, need and purpose
Students create a basic phone information system (as a simulation) using available software such as IVM Answering attendant.	* displaying, such as – the phone as the display device with voice mail – EFTPOS terminal as a display device for electronic banking	* for given examples explain how data is transmitted and received
Students study the operation of VoIP, including identifying the underlying protocols and hardware used.	* interpersonal relationships	* for given examples, identify the advantages and disadvantages of the system
Class discussion comparing traditional PSTN with VoIP. (Refer p284, includes Group Task).		* compare and contrast traditional communication systems with current electronic methods
		* represent a communication system diagrammatically
		* identify the issues associated with the use of communication systems, including: – teleconferencing systems – messaging systems – e-commerce – EFTPOS – electronic banking
Information Processes and Technology Program (page 23 of 48)	Class: _____ Teacher: _____ Date Completed: _____	

**Program Topic: Electronic Mail**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 16**

Davis Text: p284-292, Exercise 3D

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher presents the organisation of email messages. Teacher describes and demonstrates the role and operation of SMTP and POP during the transmission of email messages.	* messaging systems, including: – email – voice mail – Voice Over Internet Protocol (VOIP)	* identify client processing and server processing
Students identify the fields within the email contents component and data added as part of the envelope component using examples of received email messages.	* communication protocols, including: – application level protocols	* use a communication system to transmit and receive audio, video and text data
Students send and receive email messages using each of the destination address fields and observe and confirm their effect.	- http	* for given examples, identify the participants, information/data, information technology, need and purpose
Students send and receive email messages that include attachments and that include formatted messages (including those that include images). Students examine the raw received text data and compare with the formatted message displayed by the email client.	- smtp - SSL – communication control and addressing level protocols - TCP	* for given examples explain how data is transmitted and received
Students send and receive email messages from an email client and also using a command line utility such as telnet. (Refer p290-291).	- IP – transmission level protocols - Ethernet - Token ring	* for given examples, identify the advantages and disadvantages of the system
	* processing, including:	* represent a communication system diagrammatically
	– encoding and decoding analog and digital signals	* describe the structure of a data packet
	– formation of data packets	
	– routing	
	– encryption and decryption	
	– error checking - parity bit check - check sum - cyclic redundancy check (CRC)	
	* security	

**Program Topic: Electronic Commerce**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 16**

Davis Text: p294-303, Exercise 3E

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Class discussion to identify the collection and display devices used within typical ATMs. How ATMs connect to the bank or EFTPOS network.	* other systems dependent on communication technology such as:	* use a communication system to transmit and receive audio, video and text data
Class discussion of crimes associated with ATMs and how the security features within the design of ATMs. (Group Task p295).	– e-commerce – EFTPOS – electronic banking	* for given examples, identify the participants, information/data, information technology, need and purpose
Students research examples of EFTPOS terminals. Including their integration into retail POS systems.	* communication protocols, including:	* for given examples explain how data is transmitted and received
Teacher presents how EFTPOS terminals communicate with a variety of different financial institutions via a host system.	– application level protocols - http - smtp - SSL	* for given examples, identify the advantages and disadvantages of the system
Students construct a DFD to expand the DFD on page 297. (Group Task p297).	– communication control and addressing level protocols	* compare and contrast traditional communication systems with current electronic methods
Teacher describes the operation of Internet banking with particular emphasis on SSL and public key encryption. (Refer p298-299). Students use a simulation/tutorial from an Internet banking site.	- TCP - IP	* represent a communication system diagrammatically
Class discussion of illegal access to Internet banking sites. (Group Tasks p299).	– transmission level protocols	* simulate activities involved with communication in areas such as
Class discussion to brainstorm examples of Internet trading and its effects on traditional retailers.	- Ethernet - Token ring	– e-commerce – EFTPOS – Internet banking
Class discussion of Internet trading opening up a global market where retailers are often virtual organisations (in particular eBay and PayPal). Includes Group Tasks p303	* collecting, such as – the phone as the collection device with voice mail – EFTPOS terminal as a collection device for electronic banking	* describe and justify the need for ethical behaviour when using the Internet
	* displaying, such as – the phone as the display device with voice mail – EFTPOS terminal as a display device for electronic banking	* discuss the social and ethical issues that have arisen from use of the Internet, including:
	* security	– the availability of material normally restricted
	* globalisation	– electronic commerce
	* e-crime	– domination of content and control of access to the Internet
	* virtual communities	– the changing nature of social interactions
Information Processes and Technology Program (page 25 of 48)	Class: _____ Teacher: _____ Date Completed: _____	

**Program Topic: Client-Server Architecture**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 17**

Davis Text: p305-306

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher presents the underlying basis of the client-server architecture, including how one server can authenticate users and then is trusted by other servers.	* the client-server model – the role of the client and the server	* identify client processing and server processing
Teacher distinguishes between thin clients and fat clients by describing and demonstrating examples of each. Note that OASIS in many DET schools now uses thin clients.	– thin clients and fat clients – examples of clients such as web browsers and mail clients	* describe the advantages and disadvantages of client-server architecture
	– examples of servers such as print servers, mail servers and web servers	

**Program Topic: Network Topologies**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 17**

Davis Text: p307-318, Exercise 3F

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher defines the term "topology" and distinguishes between physical and logical topology.	* communication protocols, including: – application level protocols	* diagrammatically represent the topology
Students read about physical topologies (p307-311) and construct a diagram of the school network.	- http - smtp - SSL	* design and implement a communication system to meet an individual need
Teacher presents how data collisions are dealt with or avoided on logical bus, ring and star topologies. Includes description of CSMA/CD, CSMA/CA and token ring protocol.	– communication control and addressing level protocols - TCP - IP	
Students in small groups work through the logical topology section of the text and complete each of the group tasks. (Refer p311-316).	– transmission level protocols - Ethernet - Token ring	
	* network topologies, including: – star – bus – ring – hybrid – wireless networks	
	* processing, including: – encoding and decoding analog and digital signals – formation of data packets – routing – encryption and decryption – error checking - parity bit check - check sum - cyclic redundancy check (CRC)	
Information Processes and Technology Program (page 27 of 48)	Class: _____ Teacher: _____	Date Completed: _____

**Program Topic: Encoding and Decoding**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 18**

Davis Text: p320-325

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher introduces encoding/decoding. Teacher describes the operation of manchester encoding, QAM modulation and the simple DAC in Fig 3.67.	* processing, including: – encoding and decoding analog and digital signals	* distinguish between data in analog and digital form
Students in small groups work through the "Encoding and decoding analog and digital signals" section of the text. (Including completion of Group Tasks).	– formation of data packets – routing – encryption and decryption – error checking - parity bit check - check sum - cyclic redundancy check (CRC)	* justify the need to encode and decode data
		* identify where in a communication system signal conversion takes place

**Program Topic: Transmission Media**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 18**

Davis Text: p325-337, Exercise 3G

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher led class discussion and student research of each of the specified wired and wireless transmission media. Includes Group Tasks p327-336.	* transmission media, including: – wired transmissiono - twisted paio - coaxial cableo - optic fibre – wireless transmissiono - microwaveo - satelliteo - radioo - infrared	* for a given scenario, choose and justify the most appropriate transmission media
Students make notes to summarise each of the transmission media described on p325-337, including advantages and disadvantages of each.		
	* characteristics of media in terms of speed, capacity, cost and security	

**Program Topic: Network Connection Devices**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 19**

Davis Text: p339-346

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher describes the functions performed and shows examples of different network connection devices and/or demonstrates configuration screens (where appropriate). Includes Group Tasks p343-346.	* functions performed by the following hardware components used in communication systems:	* describe the location and role of hardware components on the network
Students create summaries of the significant features and processes for each of the network connection devices.	– hubs and switches	* compare the functions of different hardware components
Teacher provides a number of scenarios where multiple nodes need to be connected into a LAN. Students suggest suitable methods and devices for connection, protocols required and length of transmission media.	– routers	
	– modems	
	– bridges and gateways	
	– Network Interface Cards (NIC)	
	– mobile phones	
	– cables	
	– wireless access points	
	– bluetooth devices	

**Program Topic: Servers**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 19**

Davis Text: p346-348

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher describes and demonstrates the servers present within the school (both hardware and software). Including any performance, fault tolerance and security features.	* the client-server model – the role of the client and the server – thin clients and fat clients – examples of clients such as web browsers and mail clients	* identify client processing and server processing * describe the advantages and disadvantages of client-server architecture
Students list and summarise the processes performed by each type of server.	– examples of servers such as print servers, mail servers and web servers	

**Program Topic: Network Software**

Syllabus Topic: 9.3 Communication Systems

**HSC Week 20**

Davis Text: p349-353, Exercise 3H

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher describes the role of network operating systems using the school network as an example.	* characteristics of network operating software	* identify the main characteristics of network operating software
Teacher demonstrates network administration tasks from the syllabus using the school network.	* network administration tasks, such as: – adding/removing users – assigning users to printers – giving users file access rights – installation of software and sharing with users – client installation and protocol assignment – logon and logoff procedures – network-based applications	* detail the network management software in a given network
Students investigate the file system used on their home (or school) computers and identify the access rights that are or can be assigned.		* describe the role of the network administrator and conduct network administration tasks
Students research different examples of NOS to determine how users are authenticated and permissions are assigned.		* demonstrate logon and logoff procedures, and justify their use
		* adopt procedures to manage electronic mail

**Program Topic: Issues Related to Communication Systems****HSC Week 20**

Syllabus Topic: 9.3 Communication Systems

Davis Text: p355-360, Exercise Chapter 3 Review

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Students work in small groups. Each group researches and prepares a presentation for the class on one area. Areas may include: Internet fraud, power and control, removal of physical boundaries, interpersonal issues, work and employment issues or current and emerging trends.	* security	* describe and justify the need for ethical behaviour when using the Internet
Each small group presents their research to the whole class. Presentations may include web demonstrations, role playing, handouts and class discussions.	* globalisation	* discuss the social and ethical issues that have arisen from use of the Internet, including: – the availability of material normally restricted – electronic commerce – domination of content and control of access to the Internet – the changing nature of social interactions
Teacher presents a range of current issues and trends relating to communication systems sourced from recent news and media. Students predict the effects and likely acceptance of the new trend.	* changing nature of work	* identify the issues associated with the use of communication systems, including: – teleconferencing systems – messaging systems – e-commerce – EFTPOS – electronic banking
	* interpersonal relationships	* predict developments in communication systems based on current trends
	* e-crime	
	* legal	
	* virtual communities	
	* current and emerging trends in communication systems, including: – blogs – wikis – RSS feeds – podcasts – online radio, TV and video on demand – 3G technologies for mobile communications	

**Program Topic: Characteristics of Transaction Processing Systems**

**HSC Week 21**

Syllabus Topic: 9.4.1 Option 1: Transaction Processing Systems

Davis Text: p365-379, Exercise 4A

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher presents examples of transactions and then describes and formulates a definition of the term "transaction".	* a transaction – a series of events important to an organisation that involve a request, an acknowledgement, an action and an outcome	* recognise and describe a transaction
Class discussion to brainstorm common transactions and identify their component events and actions. Including discussion of issues should one or more events fail whilst others succeed. (Group Task p365).	* the components of a transaction processing system, including: – purpose – data – information technology – processes – participants	* analyse an existing transaction processing system to determine its strengths and weaknesses
Students read about the history of transaction processing and create a timeline as a summary. (Refer p366-368).	* the significance of data validation in transaction processing	* design and implement procedures for validating entered data
Students in small groups read about the automation of manual transaction processing (p368-371) and respond to group tasks at top of p369 and p371.	* the historical significance of transaction processing as the first type of information systems	* assess the work routine of a clerk in a manual transaction system to determine its suitability for automation
Teacher presents and describes a case study of a TPS that includes a transaction processing monitor. Teacher details the components of this TPS. Teacher details the role of the transaction log and transaction processing monitors, in terms of committing and rolling back transactions using the case study as an example. (Refer p371-375, including Group Tasks).	* storage of digital data in databases and files	* for a scenario diagrammatically represent transaction processing using data flow diagrams
Teacher introduces techniques for improving/ensuring data integrity with particular detail with regard to the ACID properties of transactions. (Refer p375-379).	* changing nature of work and the effect on participants, including: – the automation of jobs once performed by clerks – shifting of workload from clerks to members of the public	* store digital data in databases and other files in such a way that it can be retrieved, modified and further processed
	* the importance of data in transaction processing, including: – data security – data integrity – data quality	* implement systems to store paper transactions
Information Processes and Technology Program (page 34 of 48)	Class: _____ Teacher: _____	* assess the impact on participants involved in transaction processing
		* identify jobs that have changed and/or jobs that have been created as a result of transaction processing, and report on the implications of these changes for participants in the system
	Date Completed: _____	

**Program Topic: Real Time (On-Line) Transaction Processing**

**HSC Week 22**

Syllabus Topic: 9.4.1 Option 1: Transaction Processing Systems

Davis Text: p381-398, Exercise 4B

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher outlines distinguishing between real time and batch transaction processing.	* real time transaction processing – the immediate processing of data	* identify, describe and use a real time transaction processing system
Students in small groups read about reservation systems and complete the included group tasks. (Refer p382-387).	* web-based	* identify participants, data/information and information technology for the given types of transaction processing systems
Students use an online reservation system and document the data collected and the implied events occurring to complete a reservation transaction.	* non web-based	
Students in small groups read about POS systems and complete the included group tasks. (Refer p387-392).	* on-line real time	* describe the relationships between participants, data/information and information technology for the given types of transaction processing systems
Each student observes a POS system used by a retailer in their local area. Students document the sequence of events used to process a sale and the hardware/software used. Students create a context diagram and DFD to describe the data movements present in their observed system.	* updating in on-line real time systems: – relevance and impact – technology required – hardware requirements – large secondary storage – software requirements (on-line database) with user friendly interface – steps in on-line real time processing – suitable applications	
Teacher leads students through the library loans system described in the text, including group tasks. (Refer p392-397).	* collecting in transaction processing: – hardware, including: - Automatic Teller Machines (ATM) - barcode readers - Radio Frequency Identification (RFID) tags – collection from forms – screen design for on-line data collection – web forms for transaction processing (real time and batch)	* distinguish between the different types of transaction processing systems * document, including diagrammatical representations, steps in real time transaction processing * create and use a transaction processing system * design user friendly screens for on-line data collection
Students research and document the check-in and check-out transactions within the school or local library. Students identify the underlying rules and events present and the IT used.		
Students research a variety of applications of RFID tags and the operation of these tags and associated RFID readers. For example, within retail stores, warehouses and animal identification.		
Information Processes and Technology Program (page 35 of 48)	Class: _____ Teacher: _____ Date Completed: _____	

**Program Topic: Batch Transaction Processing Systems**

**HSC Week 23**

Syllabus Topic: 9.4.1 Option 1: Transaction Processing Systems

Davis Text: p400-412, Exercise 4C

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher describes batch processing with emphasis on the separation of data collection and transaction processing. (Refer p400).	* batch transaction processing – the collection and storage of data for processing at a scheduled time or when there is sufficient data	* identify, describe and use a batch transaction processing system
Teacher outlines and describes the history of batch processing as the first type of computerised transaction processing. Batch processing as an efficient strategy when data collection is not online or results are not required immediately. (Refer p401).	* batch	* distinguish between the storage of collected data and the storage of processed data in a batch system
Students summarise the steps occurring during cheque clearance (p403-404) and respond to Group Tasks on p404.	* systems that appear real time, responding as the transactions occur, but where the actual updating is batch processed, such as credit card transactions	* compare and contrast batch and real time transaction processing
Students read about bill generation (p404-405) and appreciate that bill generation uses existing data and hence is well suited to batch processing.	* retrieval of stored data to conduct further transaction processing such as printing invoices	* analyse an existing transaction processing system to determine its strengths and weaknesses
Teacher leads students through the processes occurring as credit card transactions are performed. Teacher identifies aspects that are batch processed and aspects that are processed in real time, including security, historical and other reasons for these differences. (refer p406-409, including Group Tasks).	* systems to store paper records of transactions	* assess the work routine of a clerk in a manual transaction system to determine its suitability for automation
	* updating in batch systems: – historical significance – limitations of batch processing – technology required – steps in a batch update – suitable applications	* identify participants, data/information and information technology for the given types of transaction processing systems
		* describe the relationships between participants, data/information and information technology for the given types of transaction processing systems
		* for a scenario diagrammatically represent transaction processing using data flow diagrams
		* distinguish between the different types of transaction processing systems
		* implement systems to store paper transactions
		* document, including diagrammatical representations, the steps in batch processing
		* identify systems for which batch is appropriate and is not appropriate
		* distinguish between on-line real time and batch systems
Information Processes and Technology Program (page 36 of 48)	Class: _____ Teacher: _____ Date Completed: _____	

**Program Topic: Backup and Recovery****HSC Week 24**

Syllabus Topic: 9.4.1 Option 1: Transaction Processing Systems

Davis Text: p414-423, Exercise 4D

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher describes the purpose of backup and the variety of problems it protects against (refer p414). Includes Group Tasks p414.	* data backup and recovery, including: – grandfather, father, son	* select and apply backup and recovery procedures to protect data
Teacher demonstrates as they explain the difference between full, incremental and differential backups. Includes how different combinations of these backups are restored (refer p415).	– off-site storage – secure on-site storage – full and partial backups	
Teacher describes the role of transaction logs, mirroring and rollback in terms of backup and recovery (p416).	– recovery testing – suitable media	
Students in small groups brainstorm backup techniques that protect against different types of problems (Group Task p416).	– specialised backup software – transaction logs	
Students read and summarise information about different backup media. Students respond to the included group tasks (refer p417-419).	– documenting backup and recovery procedures – mirroring	
Teacher presents common backup procedures, including GFS, round robin and towers of hanoi. Teacher demonstrates using an automated backup utility.	– rollback	

**Program Topic: Collecting in Transaction Processing Systems**

Syllabus Topic: 9.4.1 Option 1: Transaction Processing Systems

**HSC Week 25**

Davis Text: p425-434

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Students read about and describe the operation of MICR, barcode readers and magnetic stripe readers. Refer pages 425-428, including Group Tasks.	* collecting in transaction processing: – hardware, including:	* describe the operation of relevant hardware and how each is used to collect data for transaction processing
Teacher outlines design principles for paper, online and web forms using examples of good and bad design (refer p429-434).	- Automatic Teller Machines (ATM)	* design and justify paper forms to collect data for batch processing
Students use and analyse a variety of paper, online and web forms. Students suggest improvements.	- barcode readers	* design user friendly screens for on-line data collection
Students create data entry forms for an existing database.	- Radio Frequency Identification (RFID) tags	* identify existing procedures that may provide data for transaction processing
	– collection from forms	* create user interfaces for on-line real time and batch updating, and distinguish between them
	– screen design for on-line data collection	
	– web forms for transaction processing (real time and batch)	

**Program Topic: Analysing Data Output from Transaction Processing Systems**

**HSC Week 25**

Syllabus Topic: 9.4.1 Option 1: Transaction Processing Systems

Davis Text: p435-439, Exercise 4E

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher describes the organisation of data warehouses, function of MISs, the nature of DSSs and explains the role of enterprise systems.	* analysing data, in which output from transaction processing is input to different types of information systems, such as:	* identify situations where data warehousing and data mining would be an advantage
Students read about tools used to analyse the data output from TPSs (p435-439).	– decision support	
Students in small groups complete the group tasks on pages 435-439.	– management information systems	
	– data warehousing systems (for data mining)	
	– enterprise systems	

**Program Topic: Issues Related to Transaction Processing Systems**

**HSC Week 26**

Syllabus Topic: 9.4.1 Option 1: Transaction Processing Systems

Davis Text: p441-444, Exercise Chapter 4 Review

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Students read pages 441-444 with regard to general issues associated with TPSs and complete the included Group Tasks.	* changing nature of work and the effect on participants, including:	* assess the impact on participants involved in transaction processing
Teacher presents a variety of scenarios that present a range of relevant issues.	– the automation of jobs once performed by clerks – shifting of workload from clerks to members of the public	* identify jobs that have changed and/or jobs that have been created as a result of transaction processing, and report on the implications of these changes for participants in the system
Students in small groups brainstorm issues present in each presented system and suggest techniques for correcting or protecting against problems.	* the need for alternative procedures to deal with transactions when the TPS is not available	* discuss alternatives for when the transaction processing system is not available and explain why they need to be periodically tested
If not studying the DSS option, students read about OLAP (p472-475) and then use a simple online demonstration of an OLAP system.	* bias in data collection: – when establishing the system and deciding what data to collect – when collecting data	* identify security, bias and accuracy problems that could arise from the actions of participants
	* the importance of data in transaction processing, including: – data security – data integrity – data quality	* recognise the significance of data quality
	* control in transaction processing and the implications it has for participants in the system	
	* current and emerging trends in transaction processing – data warehousing and data mining – Online Analytical Processing (OLAP) and Online Transaction Processing (OLTP)	

**Program Topic: Characteristics and Categories of Decision Support Systems**

**HSC Week 27**

Syllabus Topic: 9.4.2 Option 2: Decision Support Systems

Davis Text: p449-451

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher outlines the nature of decisions (in particular the uncertainty present in many decision making processes) and the role of decision support systems to deal with and account for uncertainty. Includes Group tasks p449.	* decision support systems – those that assist user(s) in making a decision	* select and recommend situations where decision support systems could be used
Teacher presents the continuum from structured, semi-structured to unstructured decisions. Teacher describes distinguishing features of each category using examples. Includes Group tasks p450.	* the interactive nature of decision support systems	* classify situations which are structured, semistructured or unstructured
Students summarise page 451 detailing characteristics of DSSs.	* the nature of decision support systems which model, graph or chart situations to support human decision making	
	* structured: – decisions are automated – decision support systems are not required	
	* semistructured: – there is a method to follow – requirements are clear cut	
	* unstructured: – there is no method to reach the decision – judgements are required – requires insights into the problem	

**Program Topic: Examples of Decision Support Systems**

**HSC Week 27**

Syllabus Topic: 9.4.2 Option 2: Decision Support Systems

Davis Text: p452-463, Exercise 5A

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Students work through the "Approving bank loans" semi-structured situation and complete the Group Tasks (p452-454).	* semistructured situations, such as: – a bank officer deciding how much to lend to a customer	* identify participants, data/information and information technology for an example of a decision support system
Students work through the "Fingerprint Matching" semi-structured situation and complete the Group Tasks (p455-457).	– fingerprint matching	* describe the relationships between participants, data/information and information technology for an example of a decision support system
Students work through the "Predicting Stock Prices" unstructured situation and complete the Group Tasks (p457-459).	* unstructured situations, such as: – predicting stock prices	* identify situations where decision support systems are of limited value
Students work through the "Disaster Relief Management" unstructured situation and complete the Group Tasks (p459-462). Students should research disaster relief efforts occurring as part of a recent disaster.	– disaster relief management	

**Program Topic: Tools that Support Decision Making**

**HSC Week 28**

Syllabus Topic: 9.4.2 Option 2: Decision Support Systems

Davis Text: p465-479

Teaching and Learning Strategies:	Students Learn About:	Students Learn To:
Teacher outlines and briefly describes each of the different Decision Support tools mentioned within the syllabus (p465).	* the use of systems to support decision making, including:	* extract data, based on known criteria, from an existing database to help make a decision
Students read through the outline of spreadsheets, expert systems, ANNs and databases and completes the included group tasks (p466-467).	– spreadsheets	* recognise appropriate decision support systems for a given situation
Students read and summarise the section on data warehouses, data marts and data mining. (Page 468-472, including Group Tasks)	– databases	* describe the process of data mining to search large databases for hidden patterns and relationships and use these to predict future behaviour
Students read about OLAP (p472-475, including Group Tasks).	– expert systems	* determine the sources of data for a decision support system for a given scenario
Students use an online OLAP system to illustrate data visualisation and drill downs.	– neural networks	* describe the operation of intelligent agents in situations such as search engines for the Internet
Students read and summarise the section on OLTP, GDSS, intelligent agents, GIS and MIS. (Page 475-479, including Group Tasks)	– data warehouses	* determine whether the decisions suggested by intelligent decision support systems are reasonable
	– group decision support systems	* demonstrate responsible use of a decision support system by using its findings for the intended purpose only
	– Geographic Information Systems (GIS)	* recognise the importance of business intelligence based on enterprise systems
	– Management Information Systems (MIS)	
	* data mining	
	* On-line Analytical Processing (OLAP)	
	– data visualisation	
	– drill downs	
	* storing and retrieving using intelligent agents to search data	
	* responsibilities of those performing data mining, including:	
	– erroneous inferences	
	– privacy	
	* current and emerging trends of decision support systems	
	– data warehousing and data mining	
	– Online Analytical Processing (OLAP) and Online Transaction Processing (OLTP)	
	– the emerging trend of group decision support systems and the communication it facilitates	

**Program Topic: Spreadsheets**

Syllabus Topic: 9.4.2 Option 2: Decision Support Systems

**HSC Week 29**

Davis Text: p479-489, Exercise 5B

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
<p>Students work through pages 479-489. As Students create the ABC Corporation spreadsheet as they work. Students also complete the Group Tasks as they work.</p>	<p>* designing spreadsheets: – creating a pen and paper model – identifying data sources – planning the user interface – developing formulas to be used</p>	<p>* design spreadsheets by: – linking multiple sheets to extract data and create summaries – use absolute and relative references in formulae</p>
	<p>* extracting summary data from a spreadsheet</p>	<p>* implement spreadsheets by: – entering data – naming ranges – creating templates – organising data for easy graphing – using formulae to link and organise data in cells</p>
	<p>* comparing sequences of data for similarities and differences</p>	<p>* extract information from a database for analysis using a spreadsheet, including charting relevant data</p>
		<p>* describe tools used for analytical processing</p>

**Program Topic: Advanced Spreadsheets****HSC Week 30**

Syllabus Topic: 9.4.2 Option 2: Decision Support Systems

Davis Text: p492-504, Exercise 5C

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher outlines the information emphasised by different types of charts and graphs using examples (refer p492-493).	* the use of macros to automate spreadsheet processing	* analyse trends and make predictions using an existing spreadsheet model
Teacher directs students as they record and modify a simple macro such as the ResetInputs or Zoom example in the text (refer p494-496).	* comparing sequences of data for similarities and differences	* create a simple macro in a spreadsheet
Teacher demonstrates "what-if" analysis and goal seeking using a prepared template.	* spreadsheet analysis, including: – what-if models – statistical analysis – charts	* analyse alternatives using 'what-if' scenarios
Students perform "what-if" and goal seeking using the ACB Spreadsheet as described within the text (refer p497-499).		* make predictions based on the analysis of spreadsheets
Teacher provides an unseen spreadsheet template to small groups of students. Students enter data into the template and perform "what-if" analysis and goal seeking as directed.		* describe tools used for analytical processing
Students summarise the statistical analysis techniques on page 501.		
Students reproduce Fred's spreadsheet described on page 502 using data collected from their peers. Includes Group Tasks on page 502.		
Students implement the spreadsheet from the HSC style question suggested solution on page 503-504.		
Information Processes and Technology Program (page 45 of 48)	Class: _____ Teacher: _____ Date Completed: _____	

**Program Topic: Expert Systems****HSC Week 31**

Syllabus Topic: 9.4.2 Option 2: Decision Support Systems

Davis Text: p506-525, Exercise 5D

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher describes the major components and operation of expert systems. Includes comparison of human experts and expert systems. Refer pages 506-507.	* the knowledge base of if-then rules in an expert system	* design a set of if-then rules for a particular situation
Teacher describes the detail of a typical knowledge base as they develop rules. Includes detail of the organisation of rules, attributes and facts within the expert system shell students will use. Refer p508-512.	* structure of expert systems <ul style="list-style-type: none"> <li>- knowledge base</li> <li>- database of facts</li> <li>- inference engine</li> <li>- explanation mechanism</li> <li>- user interface</li> </ul>	* diagrammatically represent the if-then rules
Students create and enter the rules for an expert system to create a knowledge base using an expert system shell.	* types of inference engines, including: <ul style="list-style-type: none"> <li>- forward chaining</li> <li>- backward chaining</li> </ul>	* enter rules and facts into an expert system shell and use it to draw conclusions or make a diagnosis
Teacher formally describes the operation of the inference engine and associated database of facts. Includes detailed explanation of backward and forward chaining. Refer pages 513-518.	* certainty factors as a means of dealing with unclear situations	* describe situations better suited to forward chaining and those better suited to backward chaining
Students use their own and other larger prepared expert systems to perform inferencing - both backward and forward chaining.	* collecting <ul style="list-style-type: none"> <li>- identification of data for decision support systems</li> <li>- the role of the expert in the creation of expert systems</li> <li>- the role of the knowledge engineer in the creation of expert systems</li> </ul>	* identify situations where user(s) of decision support systems also require knowledge in the area
Students read and summarise the steps performed to develop an expert system. Refer page 519-522.	* the reasons for decision support systems, including: <ul style="list-style-type: none"> <li>- preserving an expert's knowledge</li> <li>- improving performance and consistency in decision-making</li> <li>- rapid decisions</li> <li>- ability to analyse unstructured situations</li> </ul>	
Students review the HSC Style Question and suggested solution and answer the included Group Tasks (refer p523-525).		
Information Processes and Technology Program (page 46 of 48)	Class: _____ Teacher: _____ Date Completed: _____	

**Program Topic: Artificial Neural Networks****HSC Week 32**

Syllabus Topic: 9.4.2 Option 2: Decision Support Systems

Davis Text: p527-536, Exercise 5E

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Teacher describes the structure of artificial neural networks, including comparison with biological neural networks within the brain (refer p527-529).	* unstructured: – there is no method to reach the decision	* recognise appropriate decision support systems for a given situation
Students study the example OCR and market price prediction neural networks and complete the included Group Tasks (refer p529-531).	– judgements are required – requires insights into the problem	* compare and contrast processing methods used by databases, neural networks and expert systems
Students use an existing prepared neural network to make predictions.	* pattern matching in neural networks	* use a simple neural network to match patterns
Teacher presentation describing how neural networks learn. Includes explanation of back propagation and genetic algorithms (refer p532-533).	* the reasons for decision support systems, including: – preserving an expert’s knowledge – improving performance and consistency in decision-making	* distinguish between neural networks and expert systems
	– rapid decisions – ability to analyse unstructured situations  * responsibility for decisions made using decision support systems	

**Program Topic: Issues Related to Decision Support Systems**

**HSC Week 32**

Syllabus Topic: 9.4.2 Option 2: Decision Support Systems

Davis Text: p538-542, Exercise Chapter 5 Review

<b>Teaching and Learning Strategies:</b>	<b>Students Learn About:</b>	<b>Students Learn To:</b>
Students read and summarise information about "Reasons for intelligent decision support systems" and complete group tasks (refer p538-539).	* the reasons for decision support systems, including: – preserving an expert’s knowledge	* describe the impact on participants in decision support systems when some of their decision-making is automated and recommend measures to reduce negative impacts
Students read and summarise information about "Participants in decision support systems" and complete group tasks (refer p540-542).	– improving performance and consistency in decision-making	* identify situations where user(s) of decision support systems also require knowledge in the area
	– rapid decisions – ability to analyse unstructured situations	* determine whether the decisions suggested by intelligent decision support systems are reasonable
	* responsibilities of those performing data mining, including: – erroneous inferences	* demonstrate responsible use of a decision support system by using its findings for the intended purpose only
	– privacy	
	* responsibility for decisions made using decision support systems	* identify situations where decision support systems are of limited value