

BOARD OF STUDIES  
NEW SOUTH WALES

# **Information Processes and Technology**

## **Stage 6**

---

Software and Course Specifications

---

Higher School Certificate  
2001

---

The Board of Studies has made all reasonable attempts to locate owners of third party copyright materials and invites anyone from whom permission has not been sought to contact the Copyright Officer, Board of Studies NSW. Ph: (02) 9367 8111; fax: (02) 9279 1482.

© Board of Studies NSW 1999

Published by  
Board of Studies NSW  
GPO Box 5300  
Sydney NSW 2001  
Australia

Tel: (02) 9367 8111

Internet: <http://www.boardofstudies.nsw.edu.au>

ISBN 0 7313 4335 2

99382

# Contents

<b>Foreword</b> .....	5
<b>Introduction</b> .....	6
<b>General Specifications</b> .....	6
Context diagrams .....	6
Data dictionary .....	6
Data flow diagram .....	7
Decision tree .....	7
Decision table .....	8
System flowcharts.....	8
Level of difficulty and syntax of SQL.....	9
Block diagram.....	9
<b>Software Specifications</b> .....	9
Relational databases .....	9
Flat file database.....	10
HTML editors .....	10
Presentation software.....	11
Word processor .....	11
Spreadsheet .....	12
Audio software .....	13
Software for video processing .....	13
Animation software .....	13
Neural networks.....	13
Expert systems.....	14
Web browser .....	14
Authoring software .....	14
Electronic Mail .....	14
Control software .....	15
Charting .....	15
General purpose graphics .....	15



## Foreword

The HSC software and course specifications for Information Processes and Technology contain information pertaining to the Higher School Certificate from 2001. This information is relevant to students studying Preliminary courses from 2000. Any amendments to requirements will be notified in the *Board Bulletin* Official Notices.

These HSC software and course specifications should be read in conjunction with:

- *Information Processes and Technology Stage 6 Syllabus* and support documents
- Official Notices in the *Board Bulletin*
- Examination, Assessment and Reporting Supplement
- examination and assessment reports.

The Board of Studies reserves the right to make changes to the software and course specifications. As they are reviewed, the amendments will be published on the Board of Studies website <http://www.boardofstudies.nsw.edu.au> and notified in the Official Notices in the *Board Bulletin*.

Curriculum advice may be obtained on:

Phone (02) 9367 8246                      fax (02) 9367 8476

Board of Studies publications (syllabuses, support documents, *Board Bulletins*, specimen examination papers) may be obtained from Client Services on:

Phone (02) 9367 8495                      fax (02) 9262 8178  
(fax orders preferred)

Correspondence should be addressed to:

Board of Studies  
GPO Box 5300  
Sydney NSW 2001

## Introduction

This document has been produced to provide clarification of the depth of treatment required for some concepts in the *Information Processes and Technology Stage 6 Syllabus*. Essential and desirable software features to be used are also identified. The document should be read in conjunction with the *Information Processes and Technology Stage 6 Syllabus*.

In addition to the software and concepts detailed in this document, students should be exposed to further software and concepts that illustrate syllabus content.

The document is available on the Board's website so that it can be regularly updated.

## General Specifications

### Context diagrams

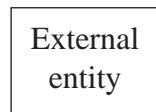
Context diagrams are used to represent entire information systems. The system is shown as a single process along with the inputs and outputs (external entities) to the system. The external entities are connected to the single process by data flow arrows. The symbols used are:



a single process representing the entire system as a circle



data flow representing the flow of data between the single process and external entities



any person or organisation that provides data to the system or receives data from the system.

### Data dictionary

A comprehensive description of each field in the database. This commonly includes: field name, number of characters (field width), data type, number of decimal places (if applicable) and a description of the purpose of each field.

## Data flow diagram

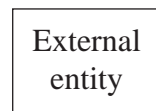
A data flow diagram is an abstraction on a context diagram. Data flow diagrams represent the information system as a number of processes that together form the single process of a context diagram. The source of data, its flow between processes and its destination along with data generated by the system is represented. The symbols used are:



a process represented by a circle. Processes are an action taking place transforming inputs to outputs



data flow, representing the flow of data between the single process and external entities



any person or organisation that provides data to the system or receives data from the system

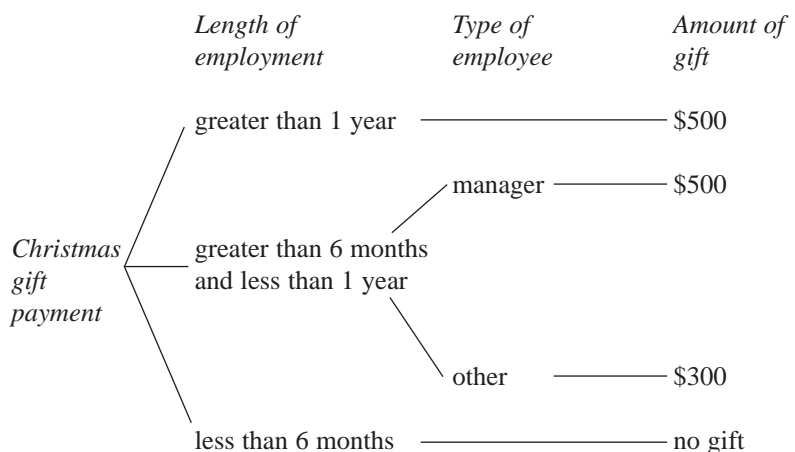


a location where data is stored. It can be in computer format, such as a diskette, or in non-computer format, such as a filing cabinet or an answering machine.

## Decision tree

A diagrammatic way of representing all possible combinations of decisions and their resulting actions. For an initial situation, branches lead in a horizontal direction to decisions and then to further decisions. Each branch ends with a particular action. This can be seen in the following example.

At Christmas, a company pays a gift of money to some of its employees. To be eligible for the gift, an employee must have worked for the company for at least six months. Managers get \$500 and other employees get \$300 for their first Christmas with the company and \$500 thereafter.



## Decision table

A table that represents all possible conditions and the actions that will result. The table is divided vertically into conditions and actions, and horizontally into the rules that are based on combinations of the conditions. This is shown in the example below.

A store has developed a policy for accepting customer cheques.

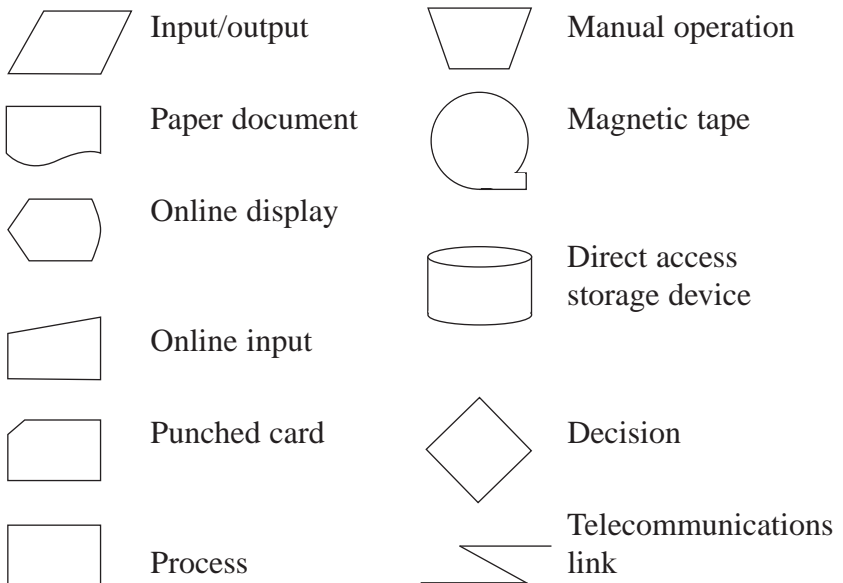
They will be accepted if all of the following conditions apply:

- cheques must be less than \$500;
- the customer must have a current driver's licence;
- cheque signature matches driver's signature.

Conditions	Rules							
Cheque < \$500	✗	✓	✗	✓	✗	✓	✗	✓
Customer has licence	✗	✗	✓	✓	✗	✗	✓	✓
Signatures match	✗	✗	✗	✗	✓	✓	✓	✓
Actions								
Cheque accepted	✗	✗	✗	✗	✗	✗	✗	✓
Cheque not accepted	✓	✓	✓	✓	✓	✓	✓	✗

## System flowcharts

System flowcharts are a diagrammatic way of representing both the flow of data and logic through an information system. They were once the primary tool for documenting systems; however, data flow diagrams are often used instead. Standard flowcharting symbols are used along with symbols for representing physical devices that capture, store and display data. Many of these symbols have become out of date as a result of changes in technology.



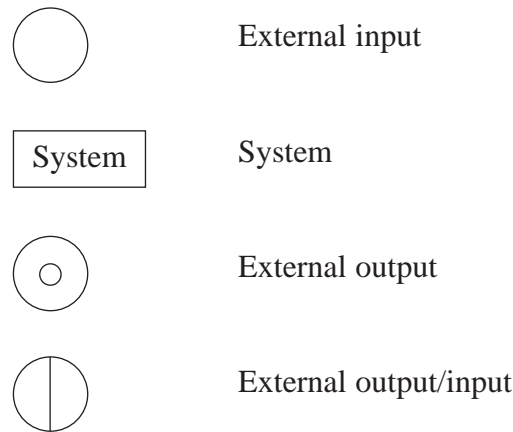
**Level of difficulty and syntax of SQL**

Structured Query Language (SQL) is a language used to access and manipulate data in relational databases. For the IPT course, students need to know the syntax required to specify searches. This is:

SELECT	(what is to be displayed)
FROM	(the tables to be used)
WHERE	(the search criteria)
ORDER BY	(the order the results are displayed)

**Block diagram**

A diagram used to represent a system. The system is shown inside a rectangle and the edge of the rectangle is the system boundary. Inputs and outputs external to the system are shown as circles. A circle with a line down the middle is used to represent output from one system that is input to another. The following are the symbols are used.



## Software Specifications

### Relational databases

Essential features

- create a simple relational database
- create search specifications using relational operators;
  - CONTAINS                      DOES NOT CONTAIN
  - EQUALS                        NOT EQUAL TO
  - GREATER THAN              GREATER THAN OR EQUAL TO
  - LESS THAN                    LESS THAN OR EQUAL TO
- create search specifications using the logical operators;
  - AND
  - OR
  - NOT
- use a query language to search on single and multiple fields across one or more tables

- sort the database on multiple fields
- produce reports
- display a schema showing the relationship between tables in the database.

#### Desirable features

- use arithmetic operators (+ -  $\times$   $\div$  at a minimum) to calculate values using existing data
- count the number of records meeting certain conditions
- create new relational databases by joining data files or parts of data files
- transfer and/or link data with other packages such as spreadsheets, word processors and communications packages
- restrict access to the database through some form of access control.

### **Flat file databases**

#### Essential features

- load existing data from a storage medium
- display the data held in the database in at least list and record format
- sort records
- create search specifications using relational and logical operators (see essential features of relational databases)
- display a particular record or a set of records on the screen
- print a particular record or set of records based on a selective query
- create and print reports based on a selective query.

#### Desirable features

- create a new flat file database by merging data files or parts of data files.

### **HTML editors**

#### Essential features

- create a HTML (at least HTML 3.2) page of formatted text
- insert images, audio and animations
- link to local HTML pages
- link to HTML pages on the World Wide Web
- link to sections within a page
- include tags
- view the HTML source of a page.

#### Desirable features

- provide additional formatting and layout features such as colour and font control
- browse created web pages
- spell and grammar checkers

## **Presentation software**

### Essential features

- provide multiple template for different layouts
- display text, image, audio and animated information
- format the display including colour and font control
- allow information to be imported from other applications
- provide notes screens
- reorder presentations
- print presentations in multiple formats:
  - single slides for overheads
  - multiple sides per page
  - side and notes on a page

### Desirable features

- crop, resize and distort graphic images
- spell and grammar checkers
- allow forwards and backwards navigation during a presentation
- allow continuous presentations

## **Word processor**

### Essential features

- move the cursor to any place in the document
- delete and insert text
- load, save and print a document
- move and copy blocks of text
- change font and style of characters and blocks of text
- format documents by changing margins, line spacing, justification and tabulation
- display a full page view of a document
- perform a spelling check on a document
- include headers and footers globally
- include page numbers globally
- insert page breaks
- employ a WYSIWYG screen display and automatic word-wrap
- create and format tables
- interchange data between applications
- carry out a mail merge
- create templates.

### Desirable features

- use a thesaurus, a writing style checker, an outliner and an add-on font package

- create and use a style sheet, in which a complete style is defined, including:
  - placement of margins
  - text alignment
  - type size
  - type style
  - stroke weight
  - type face
- automatically create an index, table of content and/or table of diagrams, figures or illustrations
- insert images and allow text wrapping around them
- use formulae with tables
- produce charts from tables
- insert hyperlinks in a document.

## Spreadsheet

### Essential features

- enter text and numeric values into cells
- copy (replicate) cells
- use absolute and relative referencing of cells
- use the arithmetic operators of ADDITION, SUBTRACTION, MULTIPLICATION, DIVISION and EXPONENTIATION and the use of parentheses in editing formulae
- enter formulae to calculate cell values
- use built in functions with a minimum set providing the equivalent of:
  - *Arithmetic:* SUM, MAXIMUM, MINIMUM, COUNT, ABSOLUTE VALUE, SQUARE ROOT, INTEGRAL PART
  - *Statistical:* MEAN, STANDARD DEVIATION
  - *Logical:* IF (allows selection of a value on the basis of a simple relation being TRUE or FALSE)
  - *Other:* LOOKUP
- recalculate values after editing a cell
- print all of the spreadsheet
- load (and save) completed spreadsheets from (to) secondary storage
- add or delete rows and columns of a spreadsheet
- change the width of a column
- change the format of a cell (including text size, text style and number of decimal places displayed)
- run and record macro routines
- interchange information with other applications.

### Desirable features

- use the relational operators of LESS THAN OR EQUAL TO, EQUAL TO, NOT EQUAL TO, GREATER THAN and GREATER THAN OR EQUAL TO

- print selected parts of the spreadsheet
- sort selected areas of the spreadsheet.

## **Audio software**

### Essential features

- record audio data in digital format
- record audio data in analogue format
- edit a recording
- play back a recording
- save a recording to a secondary storage device
- interchange data between applications.

### Desirable features

- allow audio data to be saved in a number of file formats including compressed formats and formats suitable for the Internet
- allow the mixing of audio from a variety of sources.

## **Software for video processing**

### Essential features

- capture video in digital and analogue format
- edit video images
- save video images for manipulation in other applications.

### Desirable features

- record video images on tape.

## **Animation software**

### Essential features

- create cel-based animations
- manipulate background scenes
- import two images and create a morph from one to the other
- display an animated sequence
- save animations for inclusion in other applications.

### Desirable features

- create path based animations.

## **Neural networks**

### Essential features

- enter data and outcomes whilst in a learning mode
- enter data and have the network make predictions based on the networks prior learning.

## **Expert systems**

Essential features

- enter simple IF-THEN rules
- add, remove and edit rules
- query the expert system
- display the rules that the system used to reach a conclusion.

## **Web browser**

Essential features

- handle HTML 3.2 tags
- view web pages that include text, image, audio, animated and video information
- run scripts including Java script
- navigate forwards and backwards through recently viewed pages
- view the HTML version of a page
- bookmark pages.

## **Authoring software**

Essential features

- create a multimedia production which incorporates several different types of media elements
- create a multimedia production which incorporates several pages, cards or scenes
- allow the importation and incorporation of the following media elements
  - background graphics
  - static graphics
  - animated graphics which are cel-based, path-based and morphed
  - video playing in a window, either digital video from hard disk storage or overlay type from video recorder or laser-disk player (DVD)
  - sound, both digitally recorded and MIDI sound
- allow the presentation to be played back on a computer which does not have the creating software installed (ie a run-time version should be available)
- contain a scripting language which permits system events, such as mouse button presses and keystrokes to be handled.

## **Electronic mail**

Essential features

- send and receive mail
- send and receive attachments
- forward mail
- compose mail
- reply to received mail

- send mail to multiple recipients, including carbon copies (CC)
- allow a subject to be included as part of the address
- save mail to a secondary storage device.

#### Desirable features

- maintain an address book
- spell and grammar check mail
- send (BC) blind copies of mail, mail to multiple recipients who can not tell who else has received the message.

### **Control software**

#### Essential features

- generate signals to an interface controlling a hardware system
- detect and act on signals from an interface to a hardware system.

### **Charting**

#### Essential features

- create a bar, column, line and pie chart from a table of data
- save a chart in a file format for inclusion in other documents.

#### Desirable features

- manipulate the colours and styles of individual elements of a chart
- include axis labels, titles and legends
- adjust axis scales.

### **General purpose graphics**

#### Essential features

- create and manipulate bit-mapped images
- create and manipulate vector graphics as geometric shapes
- position graphics on screen
- crop, resize and distort graphics images
- carry out the essential tasks in colour
- read from different file formats (eg reading a Paint format file in a Draw program)
- import and manipulate scanned images
- save different file formats for inclusion in other documents.

#### Desirable features

- a good paint program should provide
  - adjustable grids and rulers
  - tools to produce a point, straight line, circle, rectangle
  - a freehand paintbrush

- a capability to fill a closed area with paint
- a capability to carry out bit-level editing
- a good colour program should include
  - object masking
  - light source shading and positioning
  - dithering
  - smoothing where colours meet
  - colour separations
  - colour mixing on-screen
- a good draw program should provide the ability to
  - align objects with one another
  - group and ungroup objects
  - include bit-mapped images created by a paint program
  - incorporate text with full type style control
  - save to and read from different file formats.