This set of cards is designed for you to use as the final step in your revision programme. The author has carefully selected the most important facts of the course for you to focus on just before your exam or test.

You can use your Excel HSC Pass Cards:

On the go – in the car, bus or train. If you are by yourself, read over each card again and again until you completely master its content. If you’re with a friend, revise as a team by turning the bullet points into questions and quizzes each other on key points. Your answers will be there on the cards.

At home – at your desk. Read each card thoroughly and make sure you understand all the points. You should also know more detailed information on each topic. If you are not completely sure about a topic, look up the page reference on the bottom of each card and turn to this page in your Excel study guide.

Good luck!

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**PROJECT MANAGEMENT**

Communication Skills

- **Active listening** involves restating, reflecting and summarising the speaker’s major ideas and feelings. Active listeners encourage the speaker and are non-committal.

- **Conflict resolution** solves arguments and disputes. It involves listening to the other person’s views and looking at the conflict as a problem to be solved. The aim is to create a ‘win-win’ situation.

- **Negotiation skills** involve a discussion between two parties with a goal of reaching agreement on issues.

- **Interview techniques** involve careful preparation, implementation and follow-up.

- **Team building** is the process of getting a group of people working together.

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**PROJECT MANAGEMENT**

System Development Cycle

- **Problems with systems involves the following:**

  - Testing, evaluating and maintaining
  - Implementing the solution
  - Designing
  - Planning
  - Change of system
  - Change of purpose

  - Problem with system
  - Understanding the problem

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**PROJECT MANAGEMENT**

SDC — Understanding the Problem (2)

- A prototype is a working model of an information system. It is produced to:
  - Clarify how the existing system works.
  - Clarify the nature of the problem if the problem is not easily understood in the existing system.
  - Be modified repeatedly until the nature of the problem is understood.
  - Represent how the new system may work.
  - More accurately reflect the needs of the participants.

- The prototype is created with an application package that generates screens and reports.

- Users provide the information to create the initial prototype and provide feedback to identify errors.

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**PROJECT MANAGEMENT**

SDC — Planning (1)

- Decisions are made on possible solutions that have been developed using the requirements report and the scope of the problem.

- A constraint can affect the system and prevent it from achieving the desired objectives. Constraints are:
  - Economic — compares the costs of developing the new system with the expected benefits.
  - Technical — does the required information technology exist and what demands will be placed on the new system?
  - Schedule — determines the timeframe by which the new system must be operational.
  - Organisational — determines whether the new system will fit into the organisation and meet the current goals and objectives.

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**PROJECT MANAGEMENT**

SDC — Designing (1)

- Designing a solution is the transformation of the specifications into appropriate hardware, software and information processes.

- It involves purchasing hardware, writing or purchasing software, and specifying information processes to make the system operational.

- The new system is developed from the prototype.

- Screen designs for input and output of data are created. The format and layout of each screen, report and menu must be created using good design principles.

- The technical specifications of hardware need to be identified before the hardware is bought and installed.

- The new system must be tested before implementation. Test data is prepared to test any potential problem.

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**PROJECT MANAGEMENT**

SDC — Designing (3)

- Data dictionaries contain a comprehensive description of each field in the database.

- They commonly include a field name, data type, number of characters (field width), number of decimal places (if applicable) and a description for the purpose of the field.

- 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.
INFORMATION SYSTEMS & DATABASES
Calculation of Storage

To calculate the file size of a database:
- Use a data dictionary to calculate the storage requirements for a given number of records.
- For one record:
  - sum of field sizes = number of bytes.
- For 1000 records:
  - number of bytes x 1000 = number of kilobytes.
  - 3024
- Storage of data can be offline or online.
- The following storage media can be used:
  - Hard discs (storage capacity measured in GB).
  - Optical discs (CD or DVD).
  - A removable cartridge.
  - Magnetic tape is used as backup medium.

INFORMATION SYSTEMS & DATABASES
Database Management Systems (2)

- The degree of data independence should always be high. There are two aspects of data independence:
  1. The physical organisation of the data.
  2. The logical organisation of the data.
- Files in a database can be accessed in three different ways:
  1. Sequential file access, where each record in a file must be accessed in a series from first through to last.
  2. Indexed sequential file access allows serial access starting at various locations marked with pointers.
  3. Direct (or random) access of files still uses the key field to store the records, but as well as recording the value of the key field there is also a record of the address of the location of that record in the file.

INFORMATION SYSTEMS & DATABASES
Extracting Information from a Database (1)

- Sorting – alphabetical, numerical, chronological (either ascending or descending), a field is selected and then the sort is made. It is possible to sort on multiple fields in some databases.
- Reporting – where selection only produces a soft copy of records that satisfies a set of rules, reporting permits the production of a hard copy. For example, in a report which includes the names and addresses a set of mailing labels can be printed.
- Calculated fields – a calculated field uses numerical data. The field will contain a formula using data from other fields. For example, a formula can be entered into a field to calculate the average of students’ marks that are stored in other fields.

INFORMATION SYSTEMS & DATABASES
Social & Ethical Issues (1)

In the process of gathering and preparing data for entry into a database, and in maintaining a database with a high degree of data integrity, a number of factors need to be considered:
- Privacy – how private this information can remain.
- Security – information is a tradable and valuable commodity.
- Security measures can include:
  - Restrictions on the level of access.
  - Passwords designed to restrict initial entry.
  - Closed circuit television in computer areas.
  - Data encryption.
  - Backups of data on a regular basis.
  - A firewall can be used on the Internet or any network to verify all incoming data.

INFORMATION SYSTEMS & DATABASES
Hypertext & Hypermedia (1)

- Hypermedia is the storage of information using a set of documents that may contain text, numbers, images, audio and video.
- Hyperlink is a system where documents can be cross-linked in such a way that you can navigate from one document to the next by clicking on hyperlinks, which are electronic connections.
- The World Wide Web is the best known application of hypermedia and hypertext.
- Storyboards are a frame-by-frame plan for the website. They can include the navigation paths, the images to be used and the information to be presented.
- The URL (Uniform Resource Locator) is the address of the file or resource on the web.

COMMUNICATION SYSTEMS
Characteristics of a Communication System

- A communication system supports people who are working together by enabling the electronic exchange of data and information.
- Components of a system include the sender (source), receiver (transport medium), and message (data).
- Protocols define the meaning of information exchanged by describing parameters such as speed of transmission (bps, baud), transmission mode (answer or originate), handshake, parity, error detection and correction. Examples include X-modem, Z-modem, tftp, http, NetBEUI.
- Handshaking is the process by which two devices initiate communications. It enables a communications protocol to be agreed upon.
- Bandwidth (bps) is a measure of how much information can flow along a data pipe. Throughput refers to rate of signal change per second.

COMMUNICATION SYSTEMS
Examples of Different Systems

Teleconferencing
- Allows people in different geographical locations to communicate via a computer.
- Requires video conferencing equipment, sound and video cards and a fast network connection.
- Advantage: saves travel costs and time.
- Disadvantage: loose interpersonal relationships.

Messaging system
- Technology that supports transmission of messages and sometimes files between users.
- Examples include voice mail systems, electronic mail and the more traditional facsimile.

Ring network
- Consists of a number of nodes connected to a closed loop.

Bus network
- A common cable, called a bus, connects all nodes in the topology.

Star network
- All nodes connect to a central point.

Hybrid network
- A combination of more than one type of topology.

A communications channel is the physical medium over which data travels in a telecommunications system.
- Microwave
- Voice and data transmission.
- Super high frequency (3Ghz-10GHz), line of site.
- Impacted by weather.
- Examples include Internet access, pay TV.
- Radio waves
- Voice and data transmission.
- Limited bandwidth and range.
- Limited security.
- Examples include LAN communication, Bluetooth, mobile phones (GSM, GPS), infrared, WIFI.
COMMUNICATION SYSTEMS
Network Hardware

- A bridge links two LANs with similar protocols and restricts broadcast traffic to secure side of device.
- A hub connects multiple LAN nodes on a port-by-port basis. All traffic is repeated to all other ports on device.
- A switch connects multiple LAN nodes on a port-by-port basis. Dedicates entire bandwidth to single port by transmitting packets to destination port only.
- A gateway links LANs that are utilising different protocols.
- Repeaters interconnect networks with different structures or topologies.
- WAP (wireless access point).

COMMUNICATION SYSTEMS
Other Processes

- Collecting: Examples include EFTPOS, voicemail, phone, keyboard.
- Processing: Centralised, parallel or distributed processing.
- Analogue to digital conversion involves a process called sampling. Sampling size describes the number of bits used to store each sample from the analogue wave. Sampling rate refers to the number of samples or slices taken of the analogue wave in 1 second. CD quality would be 32-bit sample size and a rate of 44.1kHz.
- Displaying: Examples include CRT, LCD, mobile phones or ATM screens.

TRANSACTION PROCESSING SYSTEMS
Transaction Processing

- A transaction is an event (such as ordering a product) that creates or modifies data in a computerised or manual system.
- Transaction processing systems (TPS) are used to process everyday transactions, with large amounts of data involved.
- People are also involved in TPS, including:
  - Users of information systems (e.g., company employees using the TPS).
  - Participants (e.g., people who perform the transaction processing).
  - People from the wider environment (e.g., credit card owners).
- Storage media will depend on the volume of data to be stored, from zip disks to CD-RVs, DVD-RAMS and tapes.
- Storage software is specially designed to perform full or partial backups.
- Recovery is performed by a recovery management program.
- Types of recovery include:
  - Backward, which has to undo the unwanted changes from aborted transactions (a slow method).
  - Forward, which starts with a recent stored full backup, adds the partial backups in order to most recent (a faster method).

TRANSACTION PROCESSING SYSTEMS
Storing & Retrieving Data

- Transaction data is normally stored in digital form in relational or flat file databases (sometimes as other files depending on the data format).
- Data is often collected as batched paperwork and processed each day.
- Storage of millions of transactions (in very large companies) may be on huge hard drives with tape backups.
- Databases may store data as sequential files, indexed sequential files or as hashed files.
- Retrieving data for analysis is difficult while data entry is occurring, and so periodic downloads into separate databases (termed data warehousing) is normally performed.

TRANSACTION PROCESSING SYSTEMS
Analysis of Data & Related Issues

- Once processed and stored, transaction data may be the input for other information systems, including:
  - Decision Support Systems (DSS) are programs to assist management in dealing with first time situations where no precedents are available.
  - Management Information Systems (MIS) are programs to assist management in planning and decision-making by producing reports that allow improved analysis and monitoring of performance.
- The effects on the business community of TPS have been mainly about changing the nature of work, including automation of jobs (replacing people with information technology) and new jobs (increased numbers of part-time workers, increased use of the Internet for making purchases etc).

TRANSACTION PROCESSING SYSTEMS
Data Accuracy, Integrity & Control

- Accuracy errors can occur because of data collection and entry and out-of-date and mismatching errors.
- Improve data accuracy requires:
  - Careful design and wording of data collection forms.
  - Checking data for accuracy at data entry.
  - Missing or out-of-range data being detected.
- Integrity is the correctness and reliability of the data. If data is not complete for every transaction, then these must be aborted or the integrity of the system can be compromised.
- Control measures must be adhered to, otherwise errors and problems with the huge volume of data will cause output from the TPS to be less reliable and therefore less useful for planning.

DECISION SUPPORT SYSTEMS
Types of Decision Support Systems

- A spreadsheet is a rectangular grid of columns and rows used to organise and store numerical data which requires some type of calculation.
- Databases are import components of decision support systems as large amounts of data can be accessed to make decisions.
- An expert system is a computer system which can solve problems for users who themselves are not experts in the field.
- Neural networks use computer circuitry to simulate the way in which a brain may process information, learn and remember.
- GIS (geographic information system)
- GDSS (group decision support system)
- MIS (management information system)
### Automated Manufacturing Systems

#### 92
**Actuators — Stepper Motors, Pneumatic & Hydraulic**
- Stepper motors are special motors that convert digital or pulsed signals into small step rotational movement (down to 1 degree of rotation) for precise movements. An example is controlling the grippers of robots to pick up objects.
- Hydraulic systems use a cylinder or fluid to produce movement in several locations with little friction. An example is a hydraulic hoist used to raise cars of service stations.
- Pneumatic systems use air inside a cylinder to produce movement or force. An example is compressed air systems used to spray paint and for a range of power tools.

### Automated Manufacturing Systems

#### 90
**Types of Processing Systems**
- The type of production system determines how flexible the manufacturing system is. The types are:
  - Continuous — no set starting or finishing times for performing the one task e.g. oil refining. Hard to reorganise to perform other functions.
  - Batch — separate production runs, with modifications made between runs. Each batch is produced for a set time, with design for easy reorganisation. An example: car manufacturing, with sedans one week, then Hatchbacks the following week.
  - Discrete — a single item is produced at a time, with multiple tasks performed on it. Every item could be different, so the setup is different every time. An example is hand-made furniture.

### Automated Manufacturing Systems

#### 88
**Signal Conversion & Conditioning**
- Since most sensors send and actuators recognise analogue signals, they must be converted between them and the controller processing these signals.
- The interface device(s) that performs these conversions are:
  - Analogue to digital (ADC).
  - Digital to analogue (DAC).
- Signal conditioning is the modifying signals to ensure a usable signal is received. This modifying or conditioning may involve:
  - Amplifying.
  - Filtering (filtering out of interference (noise)).
  - ADC, DAC.

### Multimedia

#### 98
**Digitising Audio**
- Sampling size refers to the number of bits used to store each sample from the analogue waveform. For example, an 8-bit sample can describe 256 (2^8) levels.
- Sampling rate refers to the number of samples or slices taken of the analogue waveform in one second. CD audio quality uses a sample rate of 44.1 KHz.
- To calculate file size for 2 minutes of CD audio:
  - Storage per sample = 1 bit.
  - Storage per second = 16 x 44 100 bits.
  - Storage per minute = 16 x 44 100 x 60 bits.
  - Storage (2 minutes) = 16 x 44 100 x 60 x 2 bits.
  - Total storage = 10.594 000 bytes.
  - Total storage = 10.33 MB.

### Multimedia

#### 96
**Multimedia Participants**
- A variety of skilled and specialised personnel are required to produce a complex multimedia presentation.
  - **Area of expertise**: Personnel/Task
  - **Content and data collection**: Subject matter experts (graphic artists, researchers, writers, musicians).
  - **Management**: Responsible for overall project design, development and completion (project leader, accountant).
  - **Design and layout**: Determine presentation of project, ergonomically sound layout etc. (graphic artists etc).
  - **Technical**: Assist in technical implementation (programmers etc).

### Multimedia

#### 94
**Characteristics of a Multimedia System**
- Multimedia means the presentation of information in a variety of forms and different digital media types.
- Digital media types include text, numbers, audio (MIDI and waveform), images (bitmap (pixel), vector), animation (cel and path based) and video.
- The term *hypermedia* refers to any media object which can, when clicked, navigate the user to another section or component of the system.
- *Hyperlink* refers to an item of text which behaves in the above manner.

### Multimedia

#### 104
**Social & Ethical Issues**
- **Digital convergence** is the increasing trend to merge technologies such as radio, television, phone etc into one.
- **Nature of training** and educational processes as a consequence of multimedia.
- Changing nature of work has implications for employers and employees.
- **Ethical issues**:
  - The *Copyright Act* makes it illegal to copy or reproduce a multimedia work without the express permission of the author.
  - Referencing the source of information is essential.
  - Data integrity means that the data is reliable (accurate, consistent and up-to-date).

### Multimedia

#### 102
**Other Information Processes (1)**
- **Organising**:
  - A storyboard is an illustrated scene-by-scene layout of the multimedia project. Details indicate links, buttons and destinations.
- The composite storyboard below shows linear and hierarchical elements.

### Multimedia

#### 100
**Hardware for Displaying Multimedia**
- **CRT Screens** — three electron beams (blue, red, green) strike a phosphorescent surface in a controlled manner. A glow results. Screen refresh rate is usually 72 Hz. Raster scans in horizontal lines.
- **Touch screen** — a matrix of infra-red beams, ultrasonic waves or electrically charged panels measure the location of a touch event.
- **LCD Screen** (liquid crystal display) — liquid crystal material placed between a pair of transparent electrodes that also polarises the crystal.
- **Data Projector** — uses a tiny multi-faceted semiconductor mirror chip to produce an image sharper than the traditional LCD model.
- **Speakers** — convert binary data into audible sound through a vibrating cone in the speaker.