

Y11 Computer Science – Autumn 1 – Networks and Security

Section A: Key vocabulary

| | |
|---------------------------|--|
| Network | 2 or more devices connected together. |
| Topology | The structure of the network. |
| Spyware | A program that seeks out information and sends to another individual. |
| Trojan | Program that pretends to be something else. |
| Computer virus | A program that replicates and spreads its self. |
| Pharming | A cyber attack intended to redirect a website's traffic to a fake website. |
| Cyber security | Consists of the processes, practices and technologies designed to protect networks, computers, programs and data from attack, damage or unauthorized access. |
| Threat | Something that could negatively affect a computer system. |
| Malware | An umbrella term used to refer to a variety of forms of hostile or intrusive software. |
| Social engineering | The art of manipulating people so they give up confidential information. |
| Blagging | The act of creating and using an invented scenario to engage a targeted victim in a manner that increases the chance the victim will divulge information. |
| Phishing | A technique of fraudulently obtaining private information, often using email or SMS. |
| Shouldering | Observing a person's private information over their shoulder e.g. cashpoint machine PIN numbers. |

Section B: Networks

PAN – Personal Area Network usually via Bluetooth.

LAN – Local Area Network cover relatively small geographical areas. Often owned and controlled/managed by a single person or organisation.

WAN – Wide Area Network usually cover a wide geographic area. The Internet is the biggest example of a WAN. Often under collective or distributed ownership.

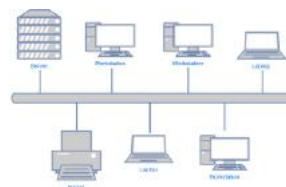
Protocols

You will need to know what all these protocols are and explain what they do.

- Ethernet
- Wi-Fi
- TCP (Transmission Control Protocol)
- UDP (User Datagram Protocol)
- IP (Internet Protocol)
- HTTP (Hypertext Transfer Protocol)
- HTTPS (Hypertext Transfer Protocol Secure)
- FTP (File Transfer Protocol)
- email protocols:
 - SMTP (Simple Mail Transfer Protocol)
 - IMAP (Internet Message Access Protocol).

Topologies

Bus Topology



Star Topology



Section C: Security

Threats

You need to understand and be able to explain the following cyber security threats:

- social engineering techniques
- malicious code (malware)
- pharming
- weak and default passwords
- misconfigured access rights
- removable media
- unpatched and/or outdated software.

Social engineering

Social engineering is techniques used to manipulate people into giving up confidential information. This includes:

- blagging
- phishing
- shouldering (or shoulder surfing).

Malware

Malicious software (malware) are programmes designed to do harm or extract data. They include:

- computer virus
- trojan
- spyware.

Security measures

Measures to protect computer systems include:

- biometric measures
- password systems
- CAPTCHA (or similar)
- using email confirmations to confirm a user's identity
- automatic software updates.

Y11 Computer Science – Autumn 2 – Issues, SQL and databases

Section A: Key vocabulary

| | |
|----------------------------|---|
| Legal | Permitted by law. |
| Ethical | Avoiding activities or organizations that do harm to people or the environment. |
| Moral | Knowing if something is right or wrong. |
| Data privacy | The right that people have to not sharing or having shared, information about them. |
| Database | A structured store for information |
| Relational database | A database that has multiple tables of data that are linked together by Primary and Foreign keys. The relationship can be one to one or one to many. |
| Table | The structure used to store the data in. A database can have multiple tables that are linked by Primary and Foreign keys. |
| Record | A whole set of data on a subject completing all fields within the table. |
| Field | A single set of data on a subject, for example Name or Age. |
| Primary key | A unique piece of data that each record has this is usually a code for example ID002. |
| Foreign key | Tables can be linked together through the use of the primary which reduces duplicating data. A field in a second table use the primary key from the first as foreign key. |
| SQL | Structured Query Language used for extracting and editing data in a database. |

Section B: Issues

Issues

For the exam you need to have a general understanding of the principles behind the following issues:

- cyber security
- mobile technologies
- wireless networking
- cloud storage
- hacking (unauthorised access to a computer system)
- wearable technologies
- computer based implants
- autonomous vehicles.

These issues can be linked to any other knowledge from the course.

Data privacy

You should be aware that ordinary citizens normally value their privacy and may not like it when governments or security services have too much access.

You should be aware that governments and security services often argue that they cannot keep their citizens safe from terrorism and other attacks unless they have access to private data.

Exam

This area is usually an essay based question where you argue for the; positive aspects linked, negative aspects linked or both with a conclusion.

Section C: SQL and Databases

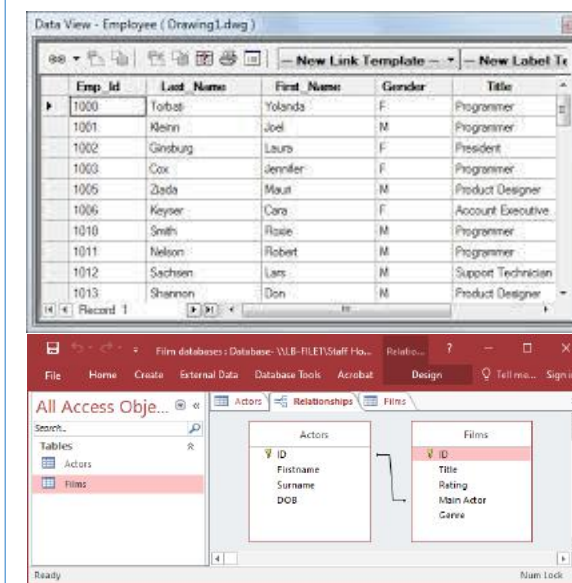
You will need to use SQL to retrieve data from a relational database, using the commands:

- SELECT
- FROM
- WHERE
- ORDER BY...ASC | DESC

You will need to use SQL to insert data into a relational database using the commands:
INSERT INTO table_name (column1, column 2 ...) VALUES (value1, value2 ...)

You will need to use SQL to edit and delete data in a database using the commands.

UPDATE table_name
SET column1 = value1, column2 = value2 ...
WHERE condition
DELETE FROM table_name WHERE condition



The image shows two screenshots from Microsoft Access. The top screenshot is a 'Data View' of an 'Employee' table with columns: Emp_id, Last Name, First Name, Gender, and Title. The bottom screenshot is a 'Relationships' view showing two tables: 'Actors' and 'Films'. The 'Actors' table has fields ID, Firstname, Surname, and DOB. The 'Films' table has fields ID, Title, Rating, Main Actor, and Genre. A relationship line connects the 'ID' field in the 'Actors' table to the 'ID' field in the 'Films' table.