GCE - JUNE 2010. PAPER 2

1. (a) i) A volatile memory loses its content in case of power failure meanwhile non-volatile does not. Volatile memory is thus said to be non-permanent storage while non-volatile is said to be permanent storage.
    ii) Volatile - RAM and non-volatile – ROM

    (b) i) The four categories of computers:
    - Super computers
    - Mainframes
    - Mini computers
    - Micro computers

    ii) Types of portable computers
    - Laptop
    - Palmtop
    - PDA
    - Notebook
    - Tablet PC

    iii) Difference between desktop and portable computers

    (c) i) fetch-decode-execute: fetch – the instructions to be executed as well as the data to be manipulated are loaded (fetched) into the main memory. Decode – once they have been loaded, the instructions are interpreted (decoded). Execute – at this stage, the instructions are run by the processing unit.
    ii) Functions of the ALU: carrying out arithmetic and logical operations, results of computations are kept in the accumulator which is part of the Arithmetic and Logic Unit.
    (d) Speed:

2. (a) Standard computer ports:
    PS/2: Mouse and Keyboard
    VGA: Monitor
    Parallel port: Printers
    Ethernet RJ45: Network cable
    USB port: Printers, Pen drives
    RJ14: Modem
    (b) User-interface refers to the medium where people and computer systems communicate or interact. - Graphical User Interface: a user interface that makes use of computer graphics. The user issues commands by using a pointing device (e.g. mouse) to point and click on icons, buttons, menus and lists on the screen.

-    Command Line Interface:a form of interface where the user types, through a command prompt, instructions for the computer to carry out.
-    Menu Driven Interface: a user interface where the user gives instructions by selecting items from menus.

(c)i) Application software is software that allows end users to accomplish one or more specific tasks. Examples: MS Word for word processing and Photoshop image editing.

ii) An electronic spreadsheet is a computer-based spreadsheet.

iii) Two formatting features of spreadsheets:

-    Font-level formatting: includes font size, **bold**, *italics* and underline etc.
-    Alignment: text can be aligned to the left, centered, aligned to the left and/or justified.

(d) i) =Average(B2:C2)

ii) Select cell D2. Place cursor at bottom left corner of cell. Click and drag down to cell D7.

iii) The function Average

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1. (a) i) Ergonomics refers to the application of scientific knowledge to the workplace in an effort to improve the efficiency and well-being of workers. ii) - monitor should be set so that your neck will be straight

-    mouse and keyboard should be placed at the same level
-    use an adjustable chair so that your feet will be fully supported by the ground
-    provide enough space under working surface
-    Your elbows should stay close to your body, bent at $90°$, with your upper arms hanging freely.
    iii) Social problems associated with ICTs

-    Computer crime: any illegal act that involves the computer either as the subject of the criminal act or as an accessory in the commission of the crime. Examples: hacking, cracking, denial of service, identity theft
-    Intellectual property: Intellectual property is considered to be intangible property created by individuals or corporations. Information technology makes it difficult to protect intellectual property because computerized information can be copied so easily and distributed on networks. Example: copying copyrighted CDs

(b) i) - the copy and paste commands make it easy to duplicate any information that has already been typed.

- it is possible to correct spellings in a document rather than cancelling in the case of paper-based.
- it also enables one to correct grammatical errors.
- it is possible to select and move text

ii) - it is easy to make calculations by just inserting formulae

-    A formula that has been entered for a particular calculation is easily copied to carryout similar calculations for other items.
-    It is easy to compare values by the use of charts

(c) The possibility and ease to deposit and withdraw money

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2. (a) i) Data is stored on and read from a compact disk via laser technology. The lens in the CD drive focuses a laser beam on the layer so as to read the stored data or write on the disk.

ii) A floppy disk has two recordable surfaces. Each surface is made up several circular bands called tracks. A track is subdivided into many small arcs called sectors.

(b) i) Number of sides = 2

Number of tracks = 10

Number of sectors = 10

Bytes per sector = 512 bytes

Therefore, floppy disk has storage capacity of $2 \times 10 \times 10 \times 512 = 102400$ bytes.

ii) 1024 bytes = 1 kilobyte => 102400 bytes = $x = \frac{102400}{1024} = 100 \ kilobytes$

iii) $102400 \div 1000 = 102.4 \ kilobytes$

(c) i) In relation to hard disk, a cylinder consists of the same track on both sides of all the platters in a hard disk.

ii) threat to data stored on hard disk: - viruses, hacking, theft, disk scratch, OS failure

iii) for viruses: data can be protected from virus attacks by the use of updated antivirus software

- OS failure: data can be kept safe by backing up data regularly. Backup consists of making copies of data that will be used to replace original data in case of data loss.

(d) i) File: it is an organized and named collection of data stored as a single item on some form of storage medium.

ii) Record: it is an individual entry in a database table

iii) Field: it is a specific piece of information stored in a table

3. (a) i) SDLC consists of the various activities involved from the time a system is conceived till the time it is up and functioning.

ii) System study, Feasibility study, System analysis, System design, Coding, Testing, Implementation, Maintenance

(b) i) Project management is the activity of defining, planning directing monitoring and controlling a project to develop an acceptable system within the allocated time and budget.

ii) A Gantt chart is a horizontal bar chart developed as a production control tool in project management. It provides a graphical illustration of a schedule that helps to plan, coordinate and track specific tasks in a project.

Task name	Duration (months)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept
Phase 1	0.5									
Phase 2	3									
Phase 3	3.5									
Phase 4	1									

(c) i) An expert system is a computer application that performs a task that would otherwise be performed by a human expert. It simulates the judgment and behavior of a human or an organization that has expert knowledge and experience in a particular field.

The system contains a knowledge base containing accumulated experience and a set of rules for applying the knowledge base to each particular situation that is described to the program. For example, there are expert systems that can diagnose human illnesses, make financial forecasts, and schedule routes for delivery vehicles.

ii) they can only respond to situations that are predefined in them.

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4. (a) i) A computer network is an interconnection of two or more computers enabling them to communicate together and share resources.

ii) Network topologies: bus topology, star topology, ring topology, mesh topology and tree topology.

iii) Wireless communication media: Bluetooth, Wi-Fi, Wi-max, GPS, radio communication, satellite

(b) i) Simplex transmission: is a transmission mode in which information can travel in only one direction.

ii) Half-duplex: a transmission setup in which information can travel in both directions, but in only one direction at a time.

iii) Full duplex: is a communication setup in which information can travel in both directions at the same time.

(c) i) Coding of information refers to the way information is represented in the computer.

ii) L= 01001011. Explanation: the code is a binary. Following the trend, to get a letter, we simply add 1 to the code of the previous letter. Adding 1 to the code corresponding to I, we get 01001010 which corresponds to J the next letter in the alphabet. Adding 1 to this, we get 01001011 which corresponds to L, the next letter after J.

iii) E is given by 01000101. To get the decimal code for E, we convert the corresponding binary code to base 10.

This implies that E= 2^6+2^2+1 = 64+4+1 = 69 Therefore,
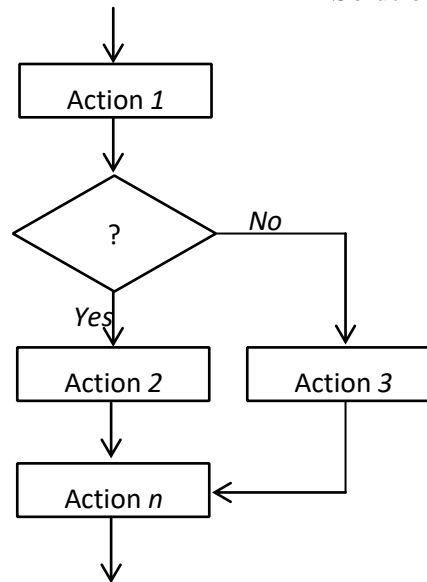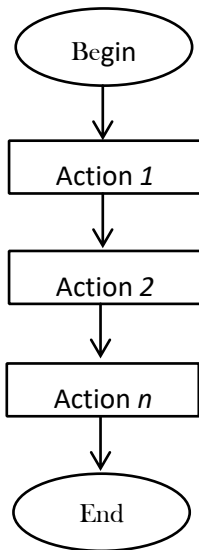
the decimal code for E is 69

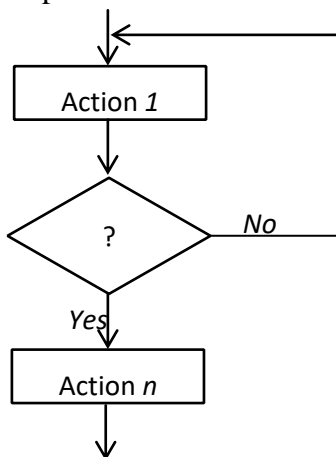iv) 66 = 01000010 = B (do the conversion from base 10 to base 2)

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5. (a) Top-down program design is when a program is broken down into subprograms which are developed separately then later on assembled together.

(b) i) Sequence   ii) Selection

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iii) Repetition

NB: Every action could be a single action or compound action (i.e. a set of actions that must be executed together)

(c) i) L4: multiplies the value of N by the counter and assigns result to the variable, product.

ii) L6: increments the counter value by 1. This ensures that the loop will terminate.

iii) Values are: 10, 20, 30, 40, 50 and 60.

iv) if the condition "less than or equal to" is changed to "less than", the loop will be executed five times instead of six and the output values will now go from 10 to 50.

v) Flowchart

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