Introduction to Computer Science

14 June 2023

Examination Paper

Answer ALL questions.

Clearly cross out surplus answers.

Time: 2 hours

The maximum mark for this paper is 50.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.

Q2. (c)
-a small amount of memory which is a part of a CPU
-temporarily stores frequently used instructions and data for quicker processing by the central processing unit of a computer

Answer ALL questions

Marks

Question 1

a) Explain the difference between data and information. **3**

State ONE (1) example. Data is a collection of facts, while information puts those facts into context.

b) State ONE (1) use of computer systems in the following organisations:

i) Hospital maintaining Patient records **1**

ii) Governments data processing **1**

iii) Travel companies reservation system **1**

c) Ameer buys a 4GB SD card for use as secondary storage in his phone.

i) Calculate how many megabytes there are in 4GB. 4000mb **1**

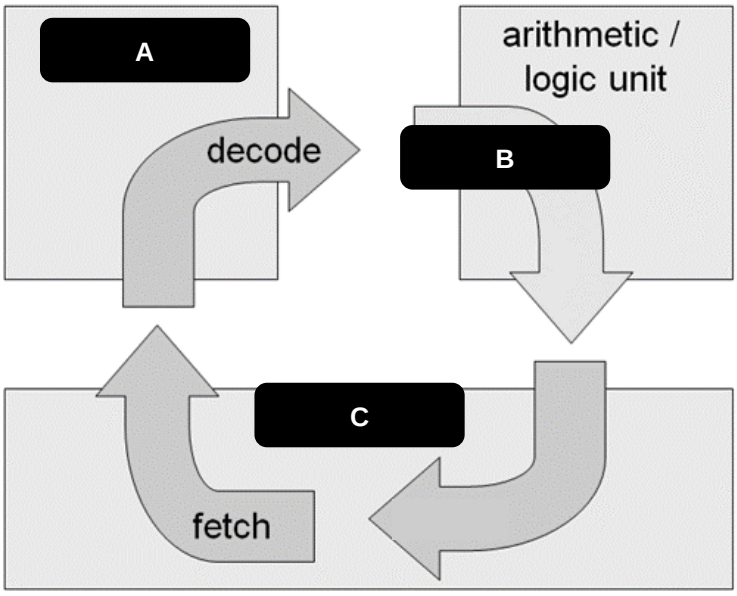
ii) An SD card is a type of solid state storage. Discuss the advantages of solid state storage compared to magnetic storage. **3**

speed, portability, reliability, durability

Total 10 Marks

Question 2

a) The diagram below shows the cycle for a processor carrying out instructions. Some labels are missing.



A. Control Unit
B. Execute
C. RAM

Questions continue on the next page

Marks

i) State the name missing at label A. **1**

ii) State the name missing at label B. **1**

iii) State the name missing at label C. **1**

b) Complete the missing words describing the purpose of a clock in a processor.

i) A computer's clock is found on a microchip that regulates the timing and speed of all the functions of a computer. **1**

ii) Faster clock speeds result in more operations being performed in a set time. **1**

iii) A clock's speed is measured in hertz. **1**

c) Explain the term cache memory and why it is used. **2**

d) Explain the purpose of driver software. **2**

-an interface to hardware and enables operating systems and hardware devices to communicate
-Controls a hardware device

Total 10 Marks

Question 3

-A vector image is made up of paths, each of which has a mathematical formula or vector
-The vector, using coordinates, indicates to the path how the each part of the image is shaped and what colour it is bordered with or filled

a) Hadi is an interior designer and has created a vector image map called *groundfloormap.ai* using Adobe Illustrator.

i) Describe the term "**vector image**". **2**

-a vector image is enlarged (scaled), it doesn't lose resolution

ii) Describe the impact on the quality of her work if she enlarges the drawing. **1**

iii) The file size of the map is 2.52 megabytes. **1**

Convert this to kilobytes. 2520kb

iv) Hadi needs to send the work to her manager. The original file is too large to send using her regular email provider. **2**

lossy and lossless

Describe TWO (2) methods Hadi could use to ensure her work can be sent to her manager.

Lossy compression produces a much smaller compressed image file.
As a file is compressed, the quality of a picture remains the same and does not deteriorate.

b) Convert the hexadecimal number 5F to a decimal number. Show your working. **2**

(b) 95

(5F)16= (5 x 16^1) + (15 x 16^0)
= (5 x 16) + (15 x 1)
= 80 + 15
= 95

c) Convert the decimal number 78 to hexadecimal. Show your working. **2**

4E

16 | 78
14 | 4
9

4
14(E)

Total 10 Marks

Questions continue on the next page

Q4. (b)
Network layer – facilitates addressing and routing of data
Data link layer – deals with digital representation of data, for example, signals that enter and leave network cables
Physical layer – transmits binary data from one computer to another

Marks

Question 4

Q4. (a)wifi, 3G 4G

a) State TWO (2) types of wireless transmission, other than Bluetooth. **2**

b) The OSI Reference Model divides network communications into SEVEN (7) layers. **6**

Each layer performs specific functions when transmitting data across a network. Describe any THREE (3) of these layers.

c) Draw a diagram showing FOUR (4) computers connected in a network using a mesh topology. **2**

Total 10 Marks

Question 5

a) The UK Copyright, Designs and Patents Act aims to protect various types of work from being copied. **2**

Identify TWO (2) types of work that are protected by the UK Copyright, Designs and Patents Act.

-Sound recordings and broadcasts
-Films

b) Discuss ONE (1) environmental issue with the increasing global ownership of mobile phones. **2**

-Energy used by hardware devices including recharging of devices
-Waste (e-waste), some of which is toxic

c) A logic circuit contains the following logic:

P = (A AND B) OR (NOT C)

i) Draw a logic gate diagram that shows the relationship between A, B, C and P. **4**

ii) State the value of P if: **1**

- A, B and C all have the initial value of 1

You **must** show your working.

A B C = p
1 1 1 1

P= (A and B) or (Not C)
1= 1 1 1

iii) State the value of C if: **1**

- A and B both have the initial value of 0
- P has the output 0

You **must** show your working.

A B C = P
0 0 0 0

P= (A and B) or (Not C)
0= 0 0 0

Total 10 Marks

End of paper