Index Number:_____ SEC09/1.22m

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2022 MAIN SESSION

SUBJECT:	**Computing**
PAPER NUMBER:	I
DATE:	25th May 2022
TIME:	4:00 p.m. to 6:05 p.m.

Directions to Candidates

Write your index number where indicated at the top of the page.
Answer **ALL** questions in the spaces provided. You are **not** allowed to use extra sheets other than those provided in this booklet.
Good English and orderly presentation are important.
The use of flowchart templates is permitted. The use of calculators is **not** permitted.
This paper carries 85 marks of the examination.

Question Number	1	2	3	4	5	6	7	8	9	10	**FOR MARKERS' USE**
For Markers' use only **MARKS**	Total number of Marks or Grade obtained by candidate										

1. As part of their Computing study course, students were given an assignment to research about the Input and Output components used in wearable devices, such as a smart watch. They were asked to document their work in any form they prefer, such as a slideshow, a text document, a web page, a video, etc. They were expected to send their work via email.

a. Which application software must be used by the students for the following tasks:

   i. do online research; _____ (1)

   ii. create a web page; _____ (1)

   iii. create a text document. _____ (1)

b. Mention **ONE** system utility that the teacher should use to prevent from receiving malware attached with the students' work.

_____(1)

(Total: 4 marks)

2. Kate, a graphic designer, and a photographer bought a laptop with enough powerful resources for her work.

a. The laptop has an INTEL i9 9800HK processor which is powered by eight cores of 2.6 GHz each. Explain what is meant by 2.6 GHz.

_____

_____(1)

b. The laptop has a 32 GB RAM.

   i. What does the acronym RAM stand for?

_____(1)

   ii. Give **TWO** characteristics of RAM.

_____

_____(2)

   iii. Describe **ONE** advantage of having 32 GB of RAM rather than 4 GB.

_____

_____(1)

c. Kate took a set of photographs for a wedding in very high-resolution which she will use during the editing stage and eventually for the printing of the wedding album. The customers chose 35 photos from the entire set and asked Kate to also have them in digital format.

i. Kate made a low-resolution copy of the chosen photos which she later sent to her customers via email. Give **ONE** reason why Kate sent the low-resolution and not the high-resolution version of the chosen photos.

_____

_____(1)

ii. The low-resolution photos take up between 350 KB and 482 KB in size. Work out the maximum storage space in MB required to store the 35 low-resolution photos.

_____(2)

iii. Suggest a suitable system utility software which Kate could use to send the 35 photos as an email attachment.

_____(1)

(Total: 9 marks)

3. Ħanut, a shopping centre situated in Sliema, uses several CCTV cameras for security purposes. An operator can watch live or recorded footage, rotate and zoom the cameras, and create a hard copy of any required screenshot whenever necessary. The operator can access these cameras by using a specific software installed on a computer which is in the same building, and which is equipped with various input and output devices.

(Source: www.flaticon.com)

a. Tick whether the devices listed below are input or output devices and mention **ONE** use of such devices in the above scenario.

Device	**Input**	**Output**	**Use**
i. Printer:	☐	☐	(2)
ii. Joystick:	☐	☐	(2)
iii. Monitor:	☐	☐	(2)

This question continues on next page.

b. The CCTV cameras are connected to a file server which is equipped with various storage devices.

i. Mention **ONE** reason why the use of a file server is required.

_____

_____(1)

ii. Which type of storage would you recommend, optical or magnetic devices? Explain.

_____

_____(2)

iii. Mention **ONE** storage device which the operator can use to save a 5-minute video footage.

_____(1)

(Total: 10 marks)

4. A football club keeps records of all the players which train in their nursery through a database.

a. What type of application software is required for the creation and maintenance of the database?

_____(1)

b. The database is made up of a set of related tables, one of them is called 'Player' table. Suggest the primary key field for this table and its data type.

_____(2)

c. The nursery has several coaches. Each player is assigned to one coach, but each coach can train several players. What type of relationship exists between the tables 'Coach' and 'Player'?

_____(1)

d. The football club has a website used for the public and a mobile app specifically for the players. Each player has a user account to log in and use the mobile app. The app has various features including displaying the player's personal details, training schedules and game fixtures.

Which **THREE** of the below mentioned IT roles are involved in the development and maintenance of the above scenario? Explain your answer.

Programmer	Computer Technician	Data Entry Clerk	Web Master	Computer Engineer

Role 1: _____(1)

Explanation: _____

_____(1)

Role 2: _____(1)

Explanation: _____

_____(1)

Role 3: _____(1)

Explanation: _____

_____(1)

(Total: 10 marks)

5. Underline the correct answer for the following statements.

a. This stores the bootstrap loader.

i. RAM ii. Hard Disk iii. ROM (1)

b. **Not** used for entering data into a digital device.

i. Keyboard ii. Barcode Reader iii. Speaker (1)

c. An office situated in Rome sends emails to clients that are located all over the world.

i. LAN ii. WAN iii. WLAN (1)

d. Data accessed by starting at the beginning and then searched through in sequence, until the required information is found.

i. Serial Access ii. Random Access iii. Direct Access (1)

e. A method to digitise a source document into a text-based document.

i. keyboard ii. OCR iii. MICR (1)

f. Which of the following is an example of a backing storage device?

i. RAM ii. ROM iii. DVD-ROM (1)

g. A doctor uses a computer to examine digital x-rays stored on the server found in the same building.

i. LAN ii. WAN iii. MAN (1)

This question continues on next page.

h. This memory component stores the data of the operating system and programs that are currently running, for access by the CPU.

i. ROM ii. Flash Memory iii. MAN (1)

i. A magnetic tape is an example of _____ storage device.

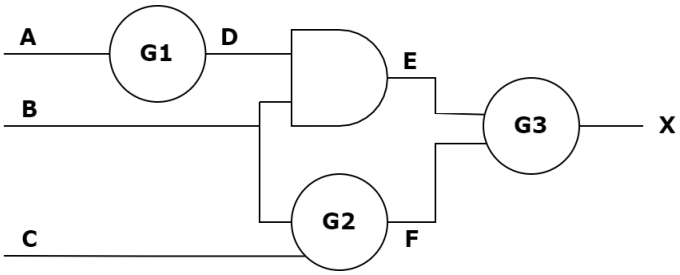
i. a Serial Access ii. a Direct Access iii. both Serial and Direct Access (1)

j. Typing the password twice.

i. Data Validation ii. Check Digit iii. Data Verification (1)

(Total: 10 marks)

6. Examine the logic circuit and the incomplete truth table shown below, and answer the questions that follow.



A	B	C	D	E	F	X
0	0	0	1	0	0	0
0	0	1				
0	1	0	1	1	0	1
0	1	1				
1	0	0				
1	0	1				
1	1	0				
1	1	1				

a. Identify the logic gates marked as G1, G2, and G3 and draw their corresponding symbol.

	Logic Gate	Symbol	
G1			(2)
G2			(2)
G3			(2)

b. Complete the above truth table. (2)

(Total: 8 marks)

7. An Operating System (OS) is a very important system software that acts as an interface between computer hardware components and the user. Which OS function from the ones listed below fits best in the following descriptions:

User Interface	File Management	Memory Management	I/O Management	Multitasking

a. Many processes appear to run simultaneously. (1)

b. Data is held in a temporary file waiting for an output device to access it. (1)

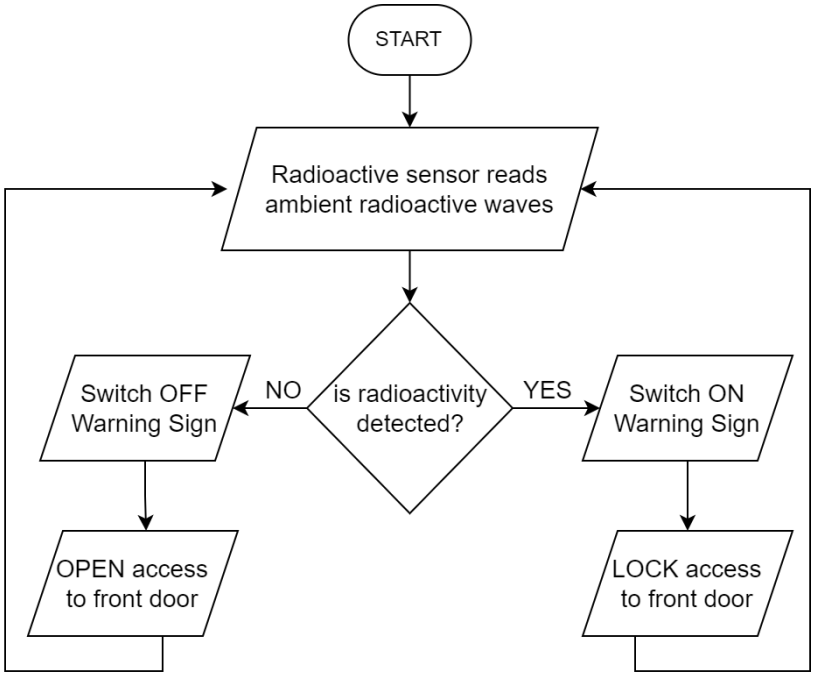
c. Offers a data structure to ensure all data can be stored and accessed when required. (1)

d. Provides users ways of how to communicate with the device. (1)

e. Ensuring that running applications have enough resources to operate properly. (1)

(Total: 5 marks)

8. X-Rays produce radioactive waves which are harmful to the body. For this reason, the algorithm shown below is used as a safety measure. Answer the questions that follow.



a. Mention **ONE** type of analogue data and **ONE** type of digital data in the above scenario.

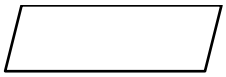
_____(2)

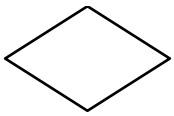
This question continues on next page.

b. Is the above system a general-purpose or a dedicated system? Explain.

_____(2)

c. Which programming construct do the below flowchart symbols represent?

i.  _____ (1)

ii.  _____ (1)

d. Mention **ONE** variable that needs to be declared when coding the above algorithm in JAVA and briefly explain its use.

_____(2)

e. Would a FOR loop be suitable in the above algorithm? Explain.

_____

_____(2)

f. Briefly explain the function of the above algorithm.

_____

_____

_____(3)

(Total: 13 marks)

9. A software development house employs several programmers who must log on to the company's system to access their work.

a. Mention **ONE** reason why it is important for the company that all programmers are logged in the system using their personal account.

_____

_____(1)

b. Mention **ONE** method which can be used as a login system.

_____(1)

c. Mention **ONE** way how the company can protect their system from being hacked.

_____(1)

d. Mention **ONE** way how the company can protect against loss or corruption of files due to hardware failure.

_____(1)

e. The company recommends that all employees take a 10-minute break every hour.

Mention **TWO** ways how the employees could ensure security from unauthorized people to access their computer whilst taking regular breaks.

_____

_____(2)

(Total: 6 marks)

10. This question is about JAVA programming language.

a. Mention the datatype which would be suitable to store the following data:

i. the name of a person; _____(1)

ii. a one-character response, such as 'Y' or 'N'; _____(1)

iii. True or False; _____(1)

iv. the price of an item. _____(1)

b. Analyse the JAVA code snippet shown below and answer the questions below.

```
Line 1:   do{
Line 2:      System.out.print("Enter a number:");
Line 3:      Keyboard.readInt(num);
Line 4:      if (num % 2 == 0)
Line 5:        odd++;
Line 6:      else
Line 7:        even++;
Line 8:   while (num > 0);
Line 9:   System.out.println("Even numbers: " + odd);
Line 10:  System.out.println("Odd numbers: " + even);
```

i. Which line of code includes an input statement?

_____(1)

ii. Line 4 includes a decision statement. Explain its condition.

_____(1)

This question continues on next page.

iii. What is happening in Line 7?

_____

_____(1)

iv. How is the looping structure stopped?

_____

_____(1)

v. The program snippet includes a logical error. Rewrite the lines of code that contain such error.

_____

_____(2)

(Total: 10 marks)

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Index Number:_____ SEC09/2A.22m

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2022 MAIN SESSION

SUBJECT:	**Computing**
PAPER NUMBER:	IIA
DATE:	27th May 2022
TIME:	4:00 p.m. to 6:05 p.m.

Directions to Candidates

Write your index number where indicated at the top of the page.
Answer **ALL** questions in the spaces provided. You are not allowed to use extra sheets other than those provided in this booklet.
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This paper carries 85 marks of the examination.

Question Number	1	2	3	4	5	**FOR MARKERS' USE**
For Markers' use only **MARKS**	Total number of Marks or Grade obtained by candidate					

1. AutoClean Ltd is a company that manufactures hand-held vacuum cleaners and automatic robot cleaners. One of its products is a robo-cleaner which can vacuum and mop the floors automatically. The robo-cleaner can also connect to the Internet and so can also be controlled by a smartphone from everywhere using its mobile app.

(Source: www.flaticon.com)

a. Should the manufacturing company program the hardware of the robo-cleaner using Low-Level Language or a High-Level Language? Explain.

_____

_____(2)

b. Should the 3rd Generation Programming Language (3GL) or a 4th Generation Language (4GL) be used for programming the mobile app? Explain.

_____

_____(2)

c. The following Assembly Language program snippet includes few instructions from the entire instruction set of the robo-cleaner.

Line 1:	LDA #1;	Load the value 1 inside the accumulator A.
Line 2:	LDX #4;	Load the value 4 inside the register X.
Line 3:	L1: MUL 2;	Multiplies the contents of accumulator A by 2 and stores the result in A.
Line 4:	SUBX 1;	Subtracts value 1 from the contents of register X and stores the result X.
Line 5:	JNZ L1;	Jump to L1 if register X is not zero.
Line 6:	STA 101;	Stores the contents of accumulator A in memory address 101.
Line 7:	HLT;	Stop program.

i. What is an instruction set?

_____

_____(1)

ii. Mention **ONE** opcode, **ONE** operand and **ONE** label from the above program snippet.

Opcode: _____ (1)

Operand: _____ (1)

Label: _____ (1)

iii. Mention **ONE** instruction from the above program snippet in which the Arithmetic and Logic Unit (ALU) is not involved during the CPU fetch and execute cycle. Explain.

_____

_____(2)

iv. Complete the following trace table showing the changes in the values of registers A, X and memory address 101 during execution of the program.

Instruction Line	A	X	Address 101
Line 1	1	-	-
Line 5			
Line 5			
Line 5			
Line 5			

(3)

v. What is the function of the above program snippet?

_____

_____(1)

vi. Write the equivalent of the above program in **ONE** JAVA statement.

_____(1)

d. Suggest **ONE** way how the robo-cleaner can connect to the Internet.

_____(1)

(Total: 16 marks)

2. One use of Hexadecimal numbers is to define different colours. Each colour is made up of three parts: RED (R), GREEN (G) and BLUE (B). Each part is represented using a 2-digit hexadecimal value. For example, the hex code for the colour orange is $FF6400_{16}$ as shown in the diagram below.

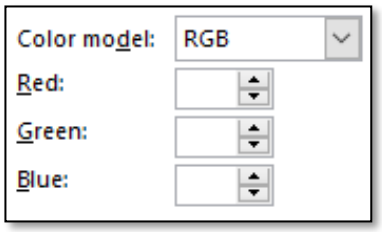
R	R	G	G	B	B
F	F	6	4	0	0

a. If each part of the code is stored as binary in an 8-bit register, show the binary bit pattern for the red part of the above code (FF_{16}). Show your working.

_____

_____(2)

b. Certain graphics applications require the colours to be coded in decimal format. Show the decimal value of the green part of the above colour code (64_{16}). Show your working.



_____

_____

_____

_____(2)

c. Can each part of the colour code be stored in a 6-bit register? Explain.

_____

_____(2)

d. A digital thermometer uses a heat sensor to detect body temperature. Once it is switched on, the user can press a button to read the body temperature and show it on the screen. If the temperature is less than 37.5 °C, the screen's backlight turns green, otherwise it turns orange.

(Source: www.flaticon.com)

i. To obtain the colour green, the thermometer subtracts 200_{10} from the red part of the orange colour code (FF_{16} - 200_{10}) using a Two's Complement 9-bit register. Show the green colour code in hexadecimal. Show your working.

_____

_____

_____

_____

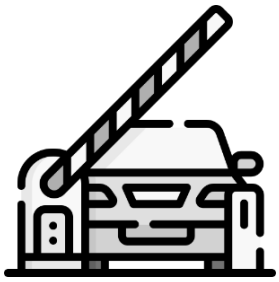
_____(6)

ii. Draw the flowchart for the digital thermometer in the space below.

(4)

(Total: 16 marks)

3. A residential complex has a car park with an automated system to control the entrance/exit barrier. The system keeps a record of the cars' number plate entering the car park. Residents in the complex do not have to pay, however other cars must pay a fee before they can exit the car park. When a car arrives at the exit barrier, the system checks three conditions before the barrier is raised (X=1):



(Source: www.flaticon.com)

- the number plate has been recorded by the system (P=1);
- whether the car belongs to a resident (S=1) or;
- a fee has been paid (F=1).

a. Construct a Boolean logic statement, using X, P, F and S, to represent the conditions necessary for the system to raise the exit barrier.

_____(2)

b. Draw a logic circuit for the above system in the space below.

(2)

This question continues on next page.

c. Draw the truth table for the above system in the space below.

(2)

d. This system uses an AVR32 processor which is a 16-bit Single Core, 150 MHz CPU.

i. A CPU is made up of the Control Unit (CU) and the Arithmetic and Logic Unit (ALU). Mention **THREE** registers found in a CPU. For each mentioned register, indicate in which unit it is found and its purpose.

Register	**Unit**	**Purpose**
		(2)

		(2)

		(2)

ii. What is the wordlength of the AVR32 processor?

_____(1)

iii. Explain how the wordlength affects the performance of the CPU.

_____

_____(1)

iv. How does the address bus limit the maximum RAM size that a system can have? Explain by means of an example.

_____

_____(2)

v. How is the control bus different from the address bus?

_____

_____(1)

vi. An important function of the CPU is the fetch and execute cycle. Briefly explain the concept of the fetch and execute cycle.

_____

_____(1)

vii. Mention **ONE** reason why the AVR32 processor is **not** ideal for a laptop.

_____

_____(1)

(Total: 19 marks)

4. BeFit Inc. owns and operates a fitness centre, and the company is planning to upgrade its computerised system to cater for a wider range of services. BeFit Inc. will be using the services of APlus Logistics Ltd for the renewal of their system.

a. The Systems Analyst is one IT role who will be engaged by APlus Logistics Ltd. Briefly explain the role of a systems analyst.

_____

_____(1)

b. Identify **TWO** ways how a systems analyst can collect information during the 'Present System Study' phase.

_____

_____(2)

c. APlus Logistics Ltd has a team of testers to test the system and provide feedback for further tuning and enhancements before launching the product. In which phase of the system development life cycle does this happen?

_____(1)

This question continues on next page.

d. Once the system has been coded, three types of documentation should have been produced in the process. Briefly describe the three types of documentation.

i. Technical Documentation.

_____

_____(1)

ii. Program Documentation.

_____

_____(1)

iii. User Manual.

_____

_____(1)

e. One of the system development life cycle stages is the Implementation and Changeover Stage.

i. Briefly explain what happens in the implementation phase.

_____

_____(1)

ii. Suggest a suitable changeover method and give a reason for your answer.

_____

_____(2)

f. The current system that BeFit Inc. uses has a menu-driven user interface which includes a menu, as shown on the right, and which is coded in JAVA as shown in the program snippet below.

Currently, when the program runs and option 1 is chosen, it displays both 'Members Menu' and 'Administrator Menu'.

MAIN MENU

1. Members
2. Administrator
3. Exit

```
Line 1:   do{
Line 2:      System.out.println("1. Members");
Line 3:      System.out.println("2. Administrator");
Line 4:      System.out.println("3. Exit");
Line 5:      System.out.print("Menu option:");
Line 6:      option = Keyboard.readInt();
Line 7:      switch (option) {
Line 8:          case 1: System.out.println("Members Menu");
Line 9:          case 2: System.out.println ("Administrator Menu");
Line 10:     }
Line 11:  } while (option != 3);
```

i. Why **cannot** this error be a Syntax error?

_____(1)

ii. What is this type of error called?

_____(1)

iii. Suggest a solution to this error without changing the decision construct used.

_____(1)

iv. Re-write the switch construct **only** using a different decision construct.

_____

_____

_____

_____

_____(3)

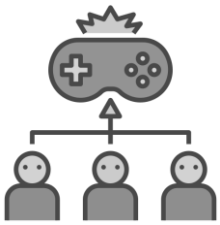
g. The system analyst remarked that the system will be more user-friendly if the menu-driven interface is changed to a Graphical User Interface. Briefly explain how a GUI will be more user-friendly.

_____

_____(1)

(Total: 17 marks)

5. Emma is organising a LAN-party during the weekend to play games in multiplayer mode with her friends. Her friends will each bring a laptop so that they can play games against each other. Emma needs a network to do this.



(Source: www.flaticon.com)

a. Define 'network'.

_____

_____ (1)

b. Emma is undecided whether to set up a LAN or a WLAN.

i. What do the acronyms LAN and WLAN stand for?

LAN: _____ (1)

WLAN: _____ (1)

This question continues on next page.

ii. Give **ONE** advantage of using LAN over WLAN. Explain your answer.

_____

_____(2)

c. If several individuals from around the globe want to play games in multiplayer mode, what type of network is required? Explain.

_____

_____(2)

d. Mention **ONE** network component that is required for connecting to a WAN. Briefly explain its use.

_____

_____(2)

e. Mention **THREE** types of communication means to connect to a WAN.

_____

_____(3)

f. Mention **ONE** factor that affects connection performance in a WAN.

_____(1)

g. Gaming in multiplayer mode around the globe usually involve the player to log on to a virtual private network using their username and password.

i. What measure is required to avoid hackers from stealing the players' username and password when logging in? Briefly explain how this measure works.

_____

_____(2)

ii. Is your answer in part (i) above a measure to enforce data security or data integrity? Explain.

_____

_____(2)

(Total: 17 marks)

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Index Number:_____ SEC09/2B.22m

L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2022 MAIN SESSION

SUBJECT:	**Computing**
PAPER NUMBER:	IIB
DATE:	27th May 2022
TIME:	4:00 p.m. to 6:05 p.m.

Directions to Candidates

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Question Number	1	2	3	4	5	**FOR MARKERS' USE**
For Markers' use only **MARKS**	Total number of Marks or Grade obtained by candidate					

1. AutoClean Ltd is a company that manufactures hand-held vacuum cleaners and automatic robot cleaners. One of its products is a robo-cleaner which can vacuum and mop the floors automatically. The robo-cleaner can also connect to the Internet and so can also be controlled by a smartphone from everywhere using its mobile app.

(Source: www.flaticon.com)

a. The manufacturers programmed the hardware of the robo-cleaner using Assembly Language. Is Assembly Language a Low or a High-level language?

_____(1)

b. Mention **ONE** factor why the manufacturers programmed the smartphone app using JAVA and **not** Assembly language.

_____

_____(1)

c. Mention **TWO** characteristics of a Low-Level language.

_____

_____(2)

d. Mention **TWO** characteristics of a High-Level language.

_____

_____(2)

e. Every program, whether coded in Low- and High-level language must be translated into a language understood by the computer, as shown in the diagram below.

i. Briefly explain the terms Source Code and Executable Code.

_____

_____(2)

ii. Identify which translator is used for programs coded in Low-Level Language.

_____(1)

iii. Identify which translators are used for programs coded in High-Level Language.

_____(2)

iv. What programming error is detected whilst a program is being translated? Give an example of such error.

_____

_____(2)

f. Suggest **ONE** way how the robo-cleaner can connect to the Internet.

_____(1)

(Total: 14 marks)

2. One use of Hexadecimal numbers is to define different colours. Each colour is made up of three parts: RED (R), GREEN (G) and BLUE (B). Each part is represented using a 2-digit hexadecimal value. For example, the hex code for the colour orange is $FF6400_{16}$ as shown in the diagram below.

R	R	G	G	B	B
F	F	6	4	0	0

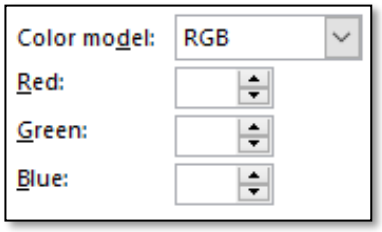
a. If each part of the code is stored as binary in an 8-bit register, show the binary bit pattern for the red part of the above code (FF_{16}). Show your working.

_____

_____

_____(2)

b. Certain graphics applications require the colours to be coded in decimal format. Show the decimal value of the green part of the above colour code (64_{16}). Show your working.



_____

_____

_____

_____(2)

c. Can each part of the colour code be stored in a 6-bit register? Explain.

_____

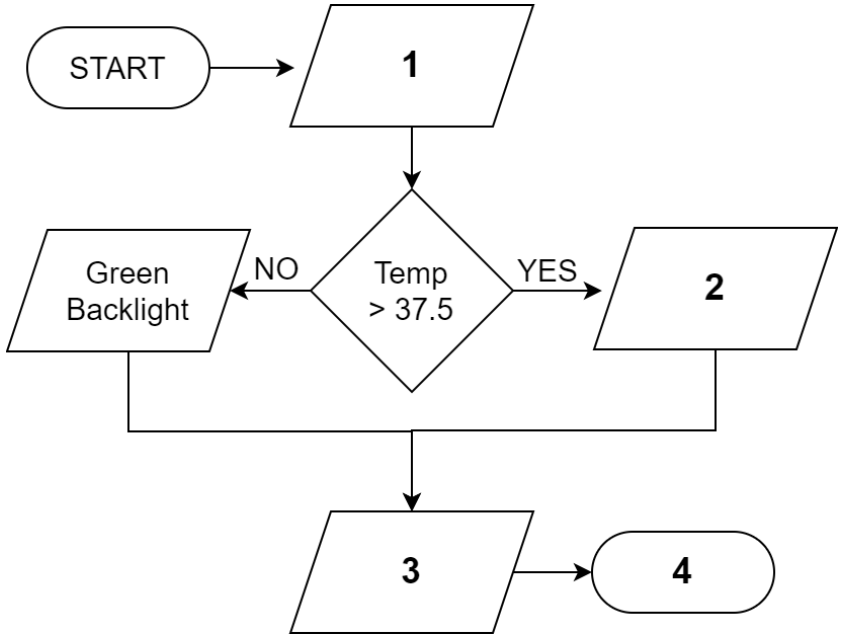
_____(2)

This question continues in next page.

d. A digital thermometer uses a heat sensor to detect body temperature. Once it is switched on, the user can press a button to read the body temperature and show it on the screen. If the temperature is less than 37.5 °C, the screen's backlight turns green, otherwise it turns orange.

(Source: www.flaticon.com)

Complete the flowchart for the digital thermometer shown below.



1: _____ (1)

2: _____ (1)

3: _____ (1)

4: _____ (1)

e. The digital thermometer can also connect to the smartphone and send the temperature readings on a software installed on the smartphone. Is this software a system software or an application software? Explain.

_____

_____(2)

f. The digital thermometer sends the temperature readings to the smartphone using the 8-bit ASCII character coding system.

i. What does ASCII stand for?

_____(1)

ii. Why are character coding systems important?

_____

_____(1)

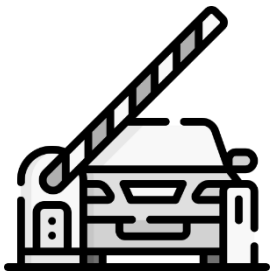
iii. How many different characters can ASCII represent?

_____(1)

(Total: 15 marks)

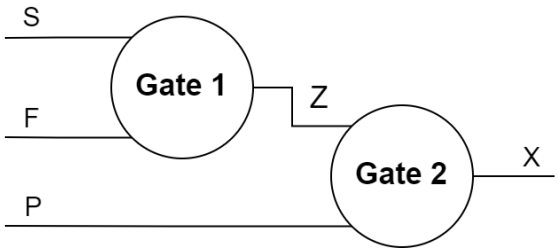
3. A residential complex has a car park with an automated system to control the entrance/exit barrier. The system keeps a record of the cars' number plate entering the car park. Residents in the complex do not have to pay, however other cars must pay a fee before they can exit the car park. When a car arrives at the exit barrier, the system checks three conditions before the barrier is raised (X=1):

   - the number plate has been recorded by the system (P=1);
   - whether the car belongs to a resident (S=1) or;
   - a fee has been paid (F=1).



(Source: www.flaticon.com)

a. The logic circuit for the cark park automated system is shown below. Determine the **TWO** missing logic gates.



GATE 1: _____ (1)

GATE 2: _____ (1)

b. Complete the below truth table for the above system. (2)

P	F	S	Z	X
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

This question continues on next page.

c. This system uses an AVR32 processor which is a 16-bit Single Core, 150 MHz CPU.

i. A CPU is made up of the Control Unit (CU) and the Arithmetic and Logic Unit (ALU). Briefly explain the purpose of these units.

_____

_____(2)

ii. The CPU contains several registers. Complete the missing sections of the table below:

Register Name	Unit where it is located	Purpose
Instruction Register		
		This register stores the address of the next instruction that needs to be processed.
	ALU	

(2)

(2)

(2)

iii. One of the key features of computer architecture is the use of the System Bus. Mention the bus that corresponds to the descriptions shown below.

Description	Bus
This bus carries signals that determines if the CPU requires a Read or a Write operation from memory.	
This bi-directional bus is used to exchange data between processor, memory, and input/ output devices.	
This uni-directional bus carries signals related to memory addresses between processor and memory.	

(1)

(1)

(1)

iv. The AVR32 processor has a 16-bit data bus. What term is used to refer to the size of the data bus?

_____(1)

v. How is the address space related to the address bus?

_____

_____(1)

vi. An important function of the CPU is the fetch and execute cycle. Continue the below missing steps:

Step 1:	CU fetches the opcode from memory location indicated by PC.
Step 2:	
Step 3:	CU fetches any required operand.
Step 4:	
Step 5:	
Step 6:	Repeats from Step 1.

(1)

(1)

(1)

(Total: 20 marks)

4. BeFit Inc. owns and operates a fitness centre, and the company is planning to upgrade its computerised system to cater for a wider range of services. BeFit Inc. will be using the services of APlus Logistics Ltd for the renewal of their system.

a. The Systems Analyst is one IT role who will be engaged by APlus Logistics Ltd. Briefly explain the role of a systems analyst.

_____

_____(1)

b. Identify **TWO** ways how a systems analyst can collect information during the 'Present System Study' phase. Tick the correct answers. (2)

☐ Interviews

☐ Developing a specification report

☐ Trying the existing system

☐ Testing for Syntax Errors

☐ Developing a code

This question continues on next page.

c. APlus Logistics Ltd has a team of testers to ensure that the system is error-free. In which phase of the system development life cycle does this happen?

_____(1)

d. Once the system has been coded, three types of documentation should have been produced in the process. Choose from the following types of documentation to complete the following paragraph:

(3)

User Manual	Technical Documentation	Program Documentation

Algorithms are found in the _____ and helps programmers to understand the internal workings of the system. On the other hand, a _____ is designed to help a user understand how to use a product; it does not go into how the product is designed and how it works internally. _____ is designed to help and support a person to understand how the product is to be installed and maintained.

e. One of the system development life cycle stages is the Implementation and Changeover Stage. The systems analyst decided that it is best to change to the new system using a Direct Changeover method.

i. Briefly explain how a Direct Changeover works.

_____

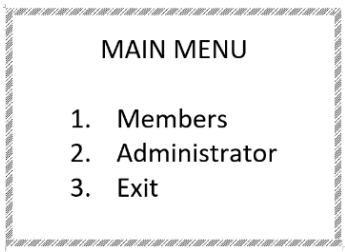
_____(1)

ii. Mention **ONE** other changeover method and briefly explain how it works.

_____

_____(2)

f. The current system that BeFit Inc. uses has a menu-driven user interface which includes a menu as shown on the right and which is coded as shown in the JAVA program snippet below.




```
Line 1:   int option = 0;
Line 2:   while (option != 3){
Line 3:     System.out.println("1. Members");
Line 4:     System.out.println("2. Administrator");
Line 5:     System.out.println("3. Exit");
Line 6:     System.out.print("Menu option:");
Line 7:     option = Keyboard.readInt();
Line 8:     switch (option) {
Line 9:       case 1: System.out.println("Members Menu"); break;
Line 10:      case 2: System.out.println ("Administrator Menu");
Line 11:  }
```

i. Identify **ONE** line of code that includes the following:

Output statement: _____ (1)

Decision statement: _____ (1)

Input statement: _____ (1)

Variable initialisation: _____ (1)

ii. If the user enters letter 'a' as a menu option, the program crashes.

(a) Why does the program crash?

_____

_____(1)

(b) What is this type of error called?

_____(1)

This question continues in next page.

iii. An if-else construct could have been used instead of the switch decision construct as shown in the incomplete code shown below. Fill in the missing code.

```
Line 1:   int option = 0;
Line 2:   while (option != 3){
Line 3:     System.out.println("1. Members");
Line 4:     System.out.println("2. Administrator");
Line 5:     System.out.println("3. Exit");
Line 6:     System.out.print("Menu option:");
Line 7:     option = Keyboard.readInt();
Line 8:     if (_____________________); {
Line 9:       System.out.println("Members Menu");
Line 10:    _________
Line 11:      ____________________________________
Line 12:  }
```

Line 8: _____(1)

Line 10: _____(1)

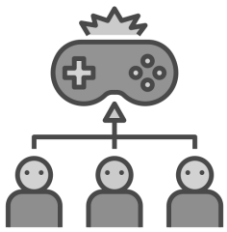
Line 11: _____(1)

g. The system analyst remarked that the system will be more user-friendly if the menu-driven interface is changed to a GUI. What does the acronym GUI stand for?

_____(1)

(Total: 20 marks)

5. Emma is organising a LAN-party during the weekend to play games in multiplayer mode with her friends. Her friends will each bring a laptop so that they can play games against each other. Emma needs a network to do this.



(Source: www.flaticon.com)

a. Define network.

_____

_____(1)

b. Emma is undecided whether to set up a LAN or a WLAN.

i. What do the acronyms LAN and WLAN stand for?

LAN: _____(1)

WLAN: _____(1)

ii. Mention **ONE** characteristic of a LAN.

_____(1)

iii. Data in a LAN is transferred faster between the connected devices than in WLAN. Briefly explain why.

_____

_____(1)

c. If several individuals from around the globe want to play games in multiplayer mode, a WAN is required. What does the acronym WAN stand for?

_____(1)

d. Mention **ONE** network which is a WAN and which is used by people from around the globe, and mention **TWO** uses of such network.

Network: _____(1)

Use 1: _____(1)

Use 2: _____(1)

e. Mention **ONE** network component that is required for connecting to a WAN. Briefly explain its use.

_____

_____(2)

f. Gaming in multiplayer mode around the globe usually requires the player to log on to a virtual private network using their username and password.

i. The method used to avoid hackers from stealing the players' details is called data encryption. Briefly explain how data encryption works.

_____

_____(1)

ii. Data encryption is a data integrity measure. Do you agree with this statement? Explain.

_____

_____(2)

iii. Mention **TWO** methods how the players can ensure password security.

_____

_____(2)

(Total: 16 marks)

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