MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD

UNIVERSITY OF MALTA, MSIDA

MATRICULATION EXAMINATION
ADVANCED LEVEL
SEPTEMBER 2017

SUBJECT:	INFORMATION TECHNOLOGY
PAPER NUMBER:	I
DATE:	4th September 2017
TIME:	9.00 a.m. to 12.05 p.m.

Directions to candidates

A total of **SIX** questions must be attempted; **THREE** from Section A and another **THREE** from Section B.

SECTION A: INFORMATION SYSTEMS

Answer the first question in this section and any other TWO questions.

Question A1
This question is compulsory. Answer all parts.

a) This part is about computer systems in general. Explain the following and give **ONE** example of each:

i. Character encoding standard (character representation standard);
ii. Computer memory that is volatile;
iii. Part of a CPU responsible for calculations;
iv. Master File;
v. User interface. (10)

b) This part is on Number base systems.
i. Convert 44_{10} to binary.
ii. Convert 103_{10} to hexadecimal.
iii. Add 10011001_2 and 10001000_2.
iv. Subtract 20_{10} from 10_{10} using an 8-bit register. (7)

c) Mention **THREE** factors that need to be taken into consideration for ethical decision making. (3)

(Total: 20 marks)

Answer any TWO questions A2, A3 and A4.

Question A2
This question is about Data and Information Systems.

a) List any **FIVE** methods used for data capture. Give **ONE** advantage for each method. (5)

b) Give **TWO** reasons why disaster planning and recovery is necessary for data used in a financial institution. (2)

c) Identify any **THREE** criteria that are important for selecting a contingency plan. (3)

d) Briefly explain any **TWO** reasons why EDI is important for modern business organisations. (2)

e) Provide **TWO** examples on how negligence can cause disruptions in IT services. (2)

f) Why is data backup important? Explain any **TWO** types of approaches used for backing up data. (5)

g) Give **ONE** scenario when RAD is suitable. (1)

(Total: 20 marks)

Question A3
This question is about Computer Systems.

a) Draw a simple diagram that shows the structure of the CPU of a computer. (6)

b) Give **TWO** advantages and **TWO** disadvantages of a CLI based user interface. (4)

c) Give **TWO** reasons why binary representation is used in computer systems. (2)

d) Briefly give **ONE** different advantage for each of the following computer categories: i) Desktop, ii) Smartphone, iii) Tablet, iv) Server, v) Notebook. (5)

e) Give **THREE** situations where primary storage is more suitable than secondary storage. (3)

(Total: 20 marks)

Question A4
This question is about Projects and Training Issues for IT Systems

a) Give any **FOUR** responsibilities of a project manager. (4)

b) Give any **FOUR** reasons why software evaluation is necessary for large projects. (4)

c) Give **TWO** reasons why training of employees engaged in modern IT systems is required frequently. (2)

d) Describe any **THREE** methods used in computer-based training. (3)

e) List and explain any **TWO** characteristics a good project team should have. (2)

f) List any **FIVE** important issues that should be addressed in a training plan for company employees as regards the use of a new IT system. (5)

(Total: 20 marks)

SECTION B: HUMAN COMMUNICATIONS & BUSINESS ORGANISATION

Answer the first question in this section and any other TWO questions.

Question B1

This question is compulsory. Answer all parts.

a) Briefly explain the following terms:
   i) wikis;
   ii) micro-blogging;
   iii) web-Conferencing;
   iv) discussion Groups. (4)

b) List any **TWO** differences between upward and downward communication in an organisation. (2)

c) Briefly describe any **TWO** responsibilities of the CIO and CSO in an organisation. (4)

d) Give any **TWO** uses of online libraries. (2)

e) List any **THREE** illegal practices related to computer systems. (3)

(Total: 15 marks)

Answer any TWO questions B2, B3 and B4.

Question B2

Information systems are becoming increasingly complex and require proper security planning. Describe the content of an information security policy. Explain any **FIVE** main issues that such a policy should address. **(Total: 15 marks)**

Question B3

ICT can be used for enhancing science and research. Various scientific fields benefit from the use of ICT. Give any **FIVE** examples where ICT can be used in science and explain. Briefly outline the basic functionality of a specific software application or package that is used for scientific research.

(Total: 15 marks)

Question B4

ICT in modern society plays a much wider role than it did in the past at the cost of new security risks and threats. Discuss this statement. Give any **FIVE** possible risks or threats and a simple example of each.

(Total: 15 marks)

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MATRICULATION EXAMINATION
ADVANCED LEVEL
SEPTEMBER 2017

SUBJECT:	INFORMATION TECHNOLOGY
PAPER NUMBER:	II
DATE:	5th September 2017
TIME:	9.00 a.m. to 12.05 p.m.

Directions to Candidates

A total of **SIX** questions must be attempted; **THREE** from Section A and another **THREE** from Section B.

SECTION A: SOFTWARE

Answer the first question in this section and any other TWO questions.

Question A1
This question is compulsory. Answer all parts.

a) Explain the following terms:
   i. quality of documentation;
   ii. performance testing;
   iii. data consistency;
   iv. compression. (8)

b) Describe the importance of communications software for business organisations. (3)

c) List and explain any **TWO** differences between compiled and interpreted applications. (4)

(Total: 15 marks)

Answer any TWO questions A2, A3 and A4.

Question A2
This question is about the Software.

a) Which operating system components are responsible for program control and memory? (4)

b) List and explain any **FOUR** categories of operating systems. (4)

c) What type of operating systems are Windows 8 and Windows 10? (2)

d) Give an example of software that is useful for hardware monitoring. (2)

e) Briefly explain the following terms: i) program portability, ii) file portability and iii) upgrade compatibility. (3)

(Total: 15 marks)

Question A3
This question is about the Internet

a) Explain the following and give **ONE** example of each: i) brute force attack and ii) password hacking. (4)

b) Why are digital certificates and digital signatures used? Clearly explain and give **TWO** reasons. (4)

c) Which type of web-feed allows users to access updates to online content in a standardised, computer-readable format? (3)

d) With reference to the Internet, explain what is meant by mobility. (2)

e) What is used for managing and registering Internet protocols? (2)

(Total: 15 marks)

Question A4
This question is about Database Systems.

a) What is data normalisation? Give any **TWO** reasons why it is important to normalize data to the 3rd normal form. (4)

b) Write a simple SQL statement that retrieves the id_no, name, surname and balance from an accounts table called ACCOUNT_TBL for all customers living in Sliema. The id_no, surname and name should be used to order the result. (6)

c) Why are views used in databases important? Briefly explain. (3)

d) Briefly explain the following terms: i) form builder and ii) report builder (2)

(Total: 15 marks)

SECTION B: PROGRAMMING TECHNIQUES AND SYSTEM DEVELOPMENT

Answer the first question in this section and any other TWO questions.

Question B1

This question is compulsory. Answer all parts.

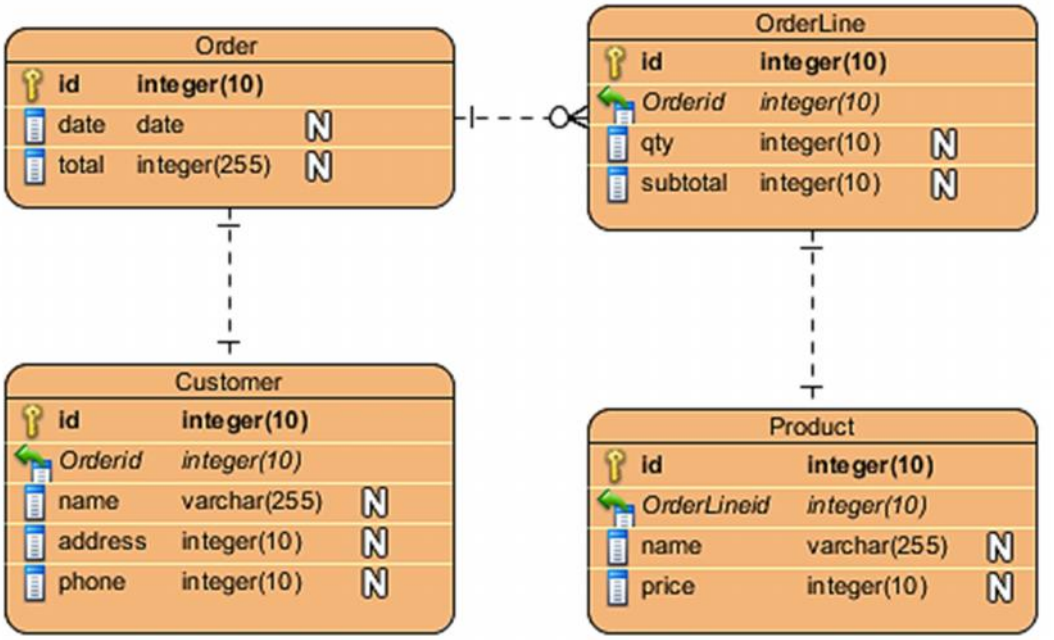
The following is a program snippet:

```
1 public class Test {
2   public static void main(String args[]) {
3     char grade = 'C';
4      switch(grade) {
5        case 'A' :
6           System.out.println("Excellent!");
7           break;
8         case 'B' :
9           System.out.println("Well done");
10          break;
11       case 'C' :
12          System.out.println("You passed");
13       case 'D' :
14          System.out.println("Better try again");
15          break;
16       default :
17          System.out.println("Invalid grade");
18    }
19    System.out.println("Your grade is " + grade);
20  }
21 }
```

a) Draw a flowchart to show the functionality of the code snippet illustrated above. (6)

b) Rewrite the code snippet using an alternative decision structure. (4)

Questions continues on next page



c) Identify **ONE** primary key and **ONE** foreign key in the E-R diagram shown above. (2)

d) Explain the significance of referential integrity using the above scenario as an example. (3)

e) Consider the following snippet:

```
1 <html>
2 <head>
3 <title>Address</title>
4 </head>
5 <body>
6 <address>
7 <p><a href="mailto:homer@example.org">homer@example.org</a></p>
8 <p>742 Evergreen Terrace, Springfield.</p>
9 </address>
10 </body>
11 </html>
```

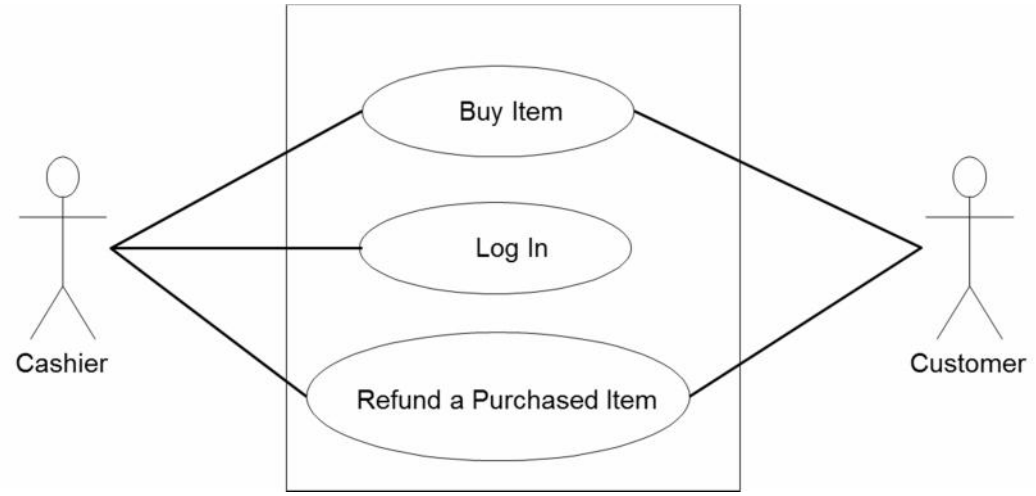
Explain any **TWO** tags in the snippet shown above. Explain the instruction in line 7. (5)

(Total: 20 marks)

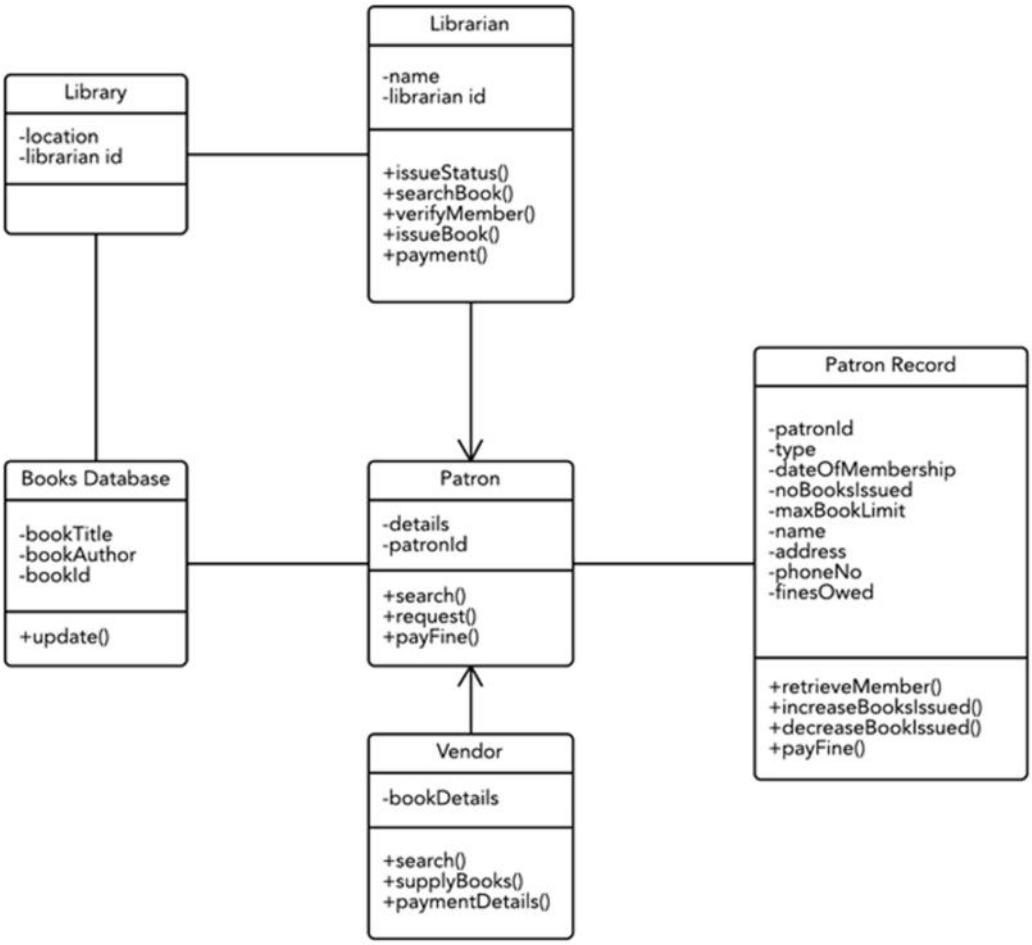
Answer ANY TWO questions B2, B3 and B4.

Question B2
This question is about System Development Techniques.

a) For the diagram given below identify i) the type of diagram it is, ii) the use cases and iii) the actors. (6)



b) Identify any **FOUR** classes, and any **TWO** attributes from the following class diagram. (6)



Question continues on next page

c) Give **TWO** keywords commonly used in programming in relation to exception handling. Briefly explain how they can be used. (4)

d) Give **TWO** keywords commonly used in programming in relation to branching. Briefly explain how they can be used. (4)

(Total: 20 marks)

Question B3
This question is about Programming Techniques.

a) Differentiate between high level languages and 4GLs. (4)

b) What is the difference between machine language and assembly language? (2)

c) List and explain any **FOUR** reserved words found in JAVA. (4)

d) List and explain any **FOUR** common string functions used in a programming language of your choice. (4)

e) Write pseudocode or high level language code that does the following: i) defines a double type array, ii) initialises the array of size 5, and iii) populates the array with values 0.0. (6)

(Total: 20 marks)

Question B4
This question is about System Development.

a) Explain how data flow in a system can be represented. (4)

b) Using pseudocode, explain a simple sorting algorithm of your choice. (6)

c) Differentiate between single and multi-user systems. (4)

d) Discuss any **THREE** advantages and **THREE** disadvantages related to system maintenance. (6)

(Total: 20 marks)