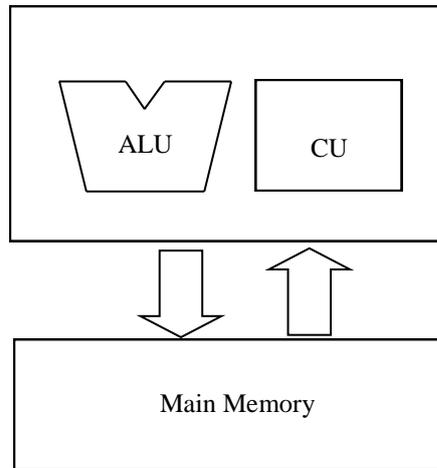




3. The diagram below shows various system components. [3]
- a. **Label** the following system components.

**ALU, CU, Main Memory**



*1 mark for each correct answer*

- b. What do the following acronyms stand for? [1]
- |     |                              |
|-----|------------------------------|
| ALU | <u>Arithmetic Logic Unit</u> |
| CU  | <u>Control Unit</u>          |
- c. Name the **bus** that carries data between the CPU and Main Memory. [1]
- Data Bus
4. There are various steps in the system lifecycle. [2]
- a. State **two** things that are normally done during the system design stage of the system lifecycle. [2]
- System flowcharts are drawn up.
  - File structures are determined. (Accept reasonable answers)
- b. What is **system changeover**? [1]
- When a company/user moves from an old system on to the new system.
- c. Give **one** advantage of the following changeover methods: [2]
- Parallel changeover  
More reliable as data loss due to teething problems is less likely.
  - Direct changeover  
Less redundancy of work (Accept reasonable answers)
5. System testing is an important step in the system lifecycle. [3]
- a. Give the term for: [3]
- Checking a program by working through a section of it manually.  
Dry Run
  - An error in a program.  
Bug
  - An error in the use of the syntactical rules of a language.  
Syntax Error

- b. Look carefully at the following section of code:  
 average = num1 + num2/total;  
 System.out.println ('The average is' + average);
- i. Identify a logic error in this code. [1]  
*The formula for average is wrong and will give an incorrect value for average.*
- 
- ii. Rewrite this code so as to fix the logical error mentioned in (ci). [1]  
*average =( num1 + num2)/total;*  
*System.out.println ('The average is ' + average);*
- 

6. Computers represent data in binary.
- a. An 8-bit register holds the binary pattern 01000001. [2]  
 i. What will be the value stored in this register after an **Arithmetic Shift Left**?  
**Left?**  
*10000010*
- 
- ii. What does an Arithmetic Shift Left do to a number?  
*It doubles the number*
- 
- b. How many different unsigned numbers can be represented by an **8-bit** register? [1]  
*256* *Accept also '2<sup>8</sup>'*
- 
- c. If in a character coding system 'A' is represented by **binary** 65, give the **binary** equivalent of 'F'. [2]  
*1000110* *1 mark for '70'*
- 

7. a. Which of the following is **System Software** and which **Application Software**? [2]

Wordprocessor	<i>System Software</i>
Operating System	<i>Application Software</i>

- b. What application software could one use to keep track of business sales? [1]  
*Spreadsheet Application* *(Accept reasonable answers)*
- c. Give **two** differences between tailor-made and off-the-shelf packages. [2]

<b>Tailor made packages</b>	<b>Off-the-shelf packages</b>
<i>Software is not immediately available</i>	<i>Readily available</i>
<i>Likely to be more expensive</i>	<i>Less expensive as it is mass-produced</i>

*(Accept reasonable answers)*

8. Java is an Object Oriented Language. [3]  
 a. Answer **True** or **False**.

i.	An object is an instance of a class.	<i>True</i>
ii.	A class is a blueprint for an object.	<i>True</i>
iii.	A programmer should not declare more than one instance for a given class.	<i>False</i>

- b. Write a line in Java to declare and create an instance called 'personA' of a class called 'Person'. [2]

*Person personA = new(Person);*

*1 mark for: Person personA;*

9. This question is about Software Documentation. [2]  
 a. Name **two** things you expect to find in program documentation.

- i. *Program listing with inline documentation*  
 ii. *System flowcharts*

*(Accept reasonable answers)*

- b. Give **two** reasons why such program documentation is important. [2]

- i. *Aids modularity: when many people are working on creating the same system / adequate documentation can help ensure that the different modules work well together.*

- ii. *Useful reference during system maintenance.*

- c. What is a user manual? [1]

*A document that offers the user instructions on installation and use of the software, including annotated tutorials etc.*

10. CPU evolution has been a long struggle to improve its efficiency. [3]  
 a. Give the term for each of the following:

i.	An electronic timer that synchronises CPU components	<i>CPU clock</i>
ii.	The number of bits the CPU can send, receive or process at a time	<i>Wordlength</i>
iii.	Very fast, volatile memory that is immediately accessible to the CPU	<i>Cache Memory/ RAM. Main Memory</i>

*(Accept reasonable answers)*

- b. What is address space? [1]

*The number of memory locations a CPU can directly access*

- c. What is the address space of a 16-bit address bus? [1]

*$2^{16}$  or 65536*

11. Registers are limited to storing a certain range of values.
- a. What is the range of unsigned numbers that can be stored in an 8-bit register? [2]  
*0 to 2<sup>8</sup>-1 Or 0 to 255*  
*1 mark for correct lower value*  
*1 mark for correct upper value*
- 
- b. Use 8-bit binary to add 34 and 244. [2]  
*100010110*  
*½ mark for 34 = 00100010*  
*½ mark for 244 = 11110100*  
*1 mark for correct answer*
- 
- c. If the result of your calculation in (b) was to be stored in an 8-bit register, what type of error would it generate? [1]  
*Overflow error*
- 

### Section B

12. Computers have various applications in society.
- a. What do the following abbreviations stand for? [3]
- |      |     |                                   |
|------|-----|-----------------------------------|
| i.   | CAD | <i>Computer Aided Design</i>      |
| ii.  | CAM | <i>Computer Aided Manufacture</i> |
| iii. | GPS | <i>Global Positioning System</i>  |
- b. Give an example of where a CAD CAM system can be used and briefly explain your answer. [2]
- |                           |  |
|---------------------------|--|
| Where CAD CAM can be used | <i>Car Manufacture</i>   |
| Explanation               | <i>CAD is used to design models and is linked to a CAM system for manufacture, often using robotic arms etc.</i> |
- (Accept reasonable answers)*  
*Do not accept non answers: e.g. 'in a factory', 'for production', 'to design' etc.*
- c. A Virtual Learning Environment (VLE) (like *Fronter*) can be a useful CAL tool. A VLE is an online facility that allows teachers to share resources with students. They also allow students to submit their work online and receive teacher feedback, results and school reports. The system can be accessed by students, parents, teachers and members of the administration who have a login name and password. [1]  
 Suggest **one** way in which a VLE can be useful in helping improve students' performance.  
 i. *Students can receive feedback on homework more immediately and this tends to improve motivation.*
- 
- (Accept reasonable answers)*

d. Name **one** use of computers in the following fields: [6]

i.	Medical diagnosis	<i>Use of ultrasound machines for detection of health issues.</i>
ii.	Office Automation	<i>Use of wordprocessor to efficiently produce and edit documents.</i>
iii.	Business	<i>Use of e-commerce to enhance trade.</i>
iv.	Aviation	<i>Use of simulators to train pilots/ use of gps etc.</i>
v.	Ecology	<i>Use of gps-enabled chips to track animal movement.</i>
vi.	School Administration	<i>Use of an online system for attendances: making it easier to track and deal with absenteeism.</i>

*(Accept reasonable answers)*

e. What does **EFTPOS** stand for? [1]  
*Electronic Fund Transfer at a Point Of Sale*

f. Explain one way **EFTPOS** is advantageous: [2]

i.	To the shop	<i>Having less money in the shop tills is safer against robbery.</i>
ii.	To the customer	<i>One does not need to carry a lot of cash on him.</i>

*(Accept reasonable answers)*

13. Below is an incomplete Java class called Student.

```
public class Student {
    String name;
    String surname;
    int totalExamMark;
    _____;//array to hold 10 marks

    public void findHighest(){
        int h = _____;
        int i;//counter

        for ( _____){
            if ( _____){
                h = markList[i];
            }
        }
        System.out.println("The highest mark is: " + h);
    }
}
```

a. Write a line to declare the array called *markList* to hold a total of 10 whole marks. [2]

*int[] markList = new int[10];*

- b. Complete the method *findHighest* such that it outputs the highest mark in the array *markList*. [3]

```
public void findHighest(){
    int h = 0;
    int i;

    for (i=0;i<10;i++){
        if (markList[i]>h){
            h = markList[i];
        }
    }
    System.out.println("The highest mark is: " + h);
}
```

- c. Write a method called *findAverage()* that finds and outputs the average of the marks in *markList*. [5]

```
public void findAverage(){
    this.totalExamMark = 0;
    int i;
    for (i=1;i<10;i++){
        this.totalExamMark += this.markList[i];
        //or this.totalExamMark = this.totalExamMark + this.markList[i];
    }
    double average = this.totalExamMark/10;
    System.out.println("The average mark is: " + average);
}
```

*1 mark for correct looping condition*  
*1 mark for finding total*  
*1 mark for declaration of variable average*  
*1 mark for output of average*  
*1 mark for correct method*

- d. Answer **True** or **False**. [3]

i.	The for loop is a predetermined loop	<i>True</i>
ii.	The while loop is executed at least once	<i>False</i>
iii.	The do...while loop is a predetermined loop	<i>False</i>

- e. The following variable types are all used for whole numbers: [2]  
**int, short, byte, long**

i.	Which of these variable types has the smallest range?	<i>byte</i>
ii.	Why is it important not to use larger variable types than necessary when writing a program?	<i>So that executing the program does not take up space unnecessarily</i>

**Computing**

Track 2

Marking Scheme

Page 1 Section A – Question 2 a i.

Outputs a 1 only **if** both inputs are 1 and not **of**