SECTION A:

Answer ALL questions in this section.

This section relates to the **C programming language**

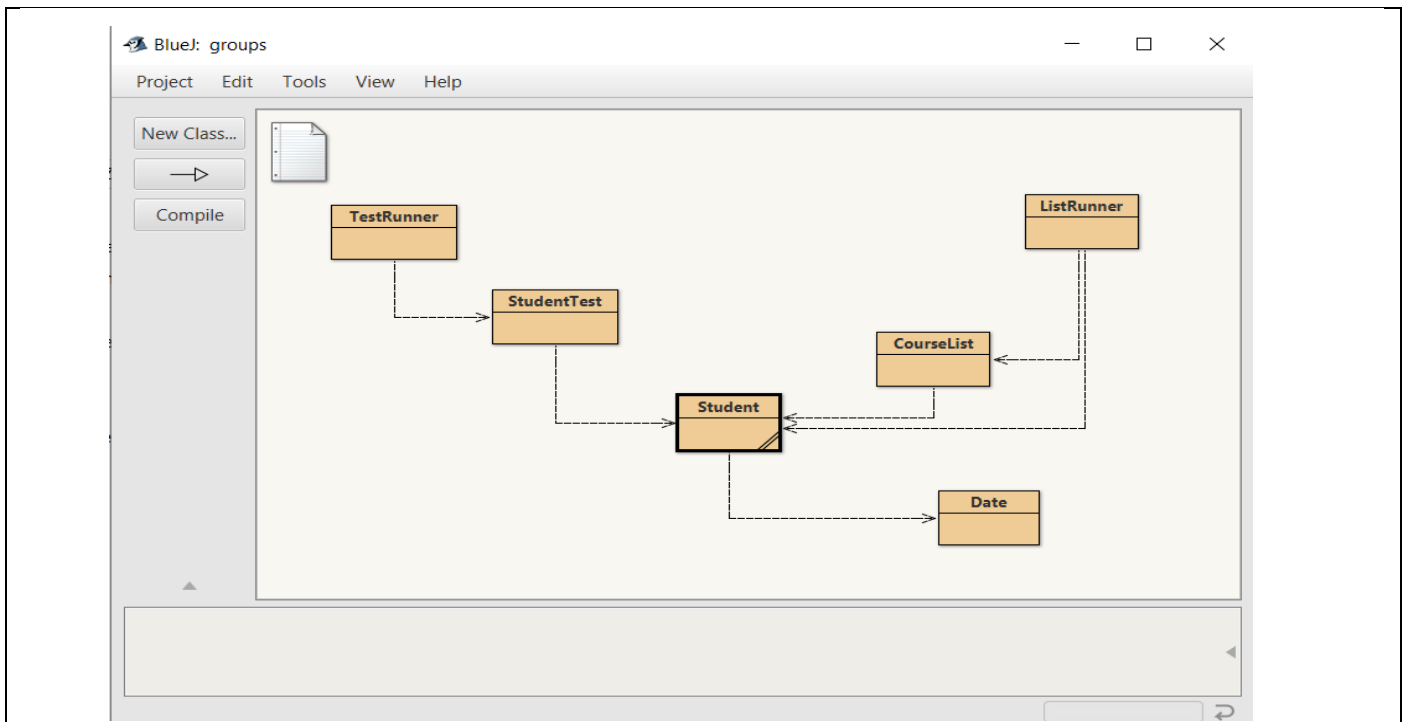|		
1	A car parking application needs to store number of car park spaces. Write the declaration for this variable, and set its value to 15 **Your answer:**	2 marks
2	The following statement is intended to allow the user to input an integer. Explain why it does not work and say how you would correct it `    scanf("%d", x);` **Your answer:**	2 marks

3	What will be the values of int variables x, y and z, after executing the following sequence of statements
	`    x = 7;`
	`    y = 12;`
	`    z = y - x;`
	`    x = x + 2 * z;`
	`    y = x / 5;`
	
	Your answer:
	x =
	y =
	z =
		3 marks

4	Write a fragment of code which asks the user to input the number of items and the weights of one item, then calculates the total weight and outputs a message in the following format: <quantity> `of items weighing` <weight> `each is` <total> where the output in `<  >` are the values of variables.	6 marks
5	When a customer has a total bill over £20, they can get a free newspaper. In addition, if the bill is over £50, they can also get 10% discount. Write a fragment of code which uses the value of the variable `total` to output whether or not the customer can get a free newspaper and a whether they also get 10% discount **Your answer**:	5 marks

6	Give the output of the following code:
	`        for (int z = 0 ; z < 4 ; z++)`
	`        {`
	`            int table = z * 5;`
	`            printf( "result = %d", table);`
	`        }`
	
	Your answer:
		2 marks

7	A function `getCost` requires a price and a quantity as a parameter, and returns the total cost. Write a definition of this function (including its signature and the function body). **Your answer**:	5 marks
8	A function calculates speed given distance and time has been defined with the following signature: `float getSpeed(float distance, float hours)` You are writing a program which allows a user to input the values of variable `miles` and `time`. Write a fragment of code to show how you would call the above function to output the speed **Your answer**:	3 marks
9	Write the code to declare an array called `menu` to hold 16 prices. **Your answer**:	5
10	Write a fragment of code to input the values stored in the array which you declared in question 9 above: **Your answer**:	3 marks
11	Explain why the "logical length" of an array and its physical length might be different. How would you ensure that only the values actually stored in an incomplete array are processed. You should consider both input and output of these values **Your answer:**	5 marks
12	Write the code to declare a pointer `myptr` to an `float`. Allocate memory space to it. Then input the value to which it will point, and output both the pointer and the value to which it points **Your answer:**	5 marks

13	You need to write a function called `convertToPercent` to convert elements of an array of float values.
	
	Explain why
	    a. the size of the array needs to be passed as a parameter
	    b. there is no need to return the processed array
		5 marks

14.	Write the signature of the function `convertToPercent` described in question 13	2 marks
15	a. Using appropriate examples to illustrate your answer, identify **TWO** ways in which the **C** programming language is similar to the **C++** programming language **Your answer:** b. Using appropriate examples to illustrate your answer, identify **THREE** ways in which the **C** programming language is different from the **C++** programming language **Your answer:**	10 marks

SECTION B:

Answer ALL questions in this section.

This section relates to the **Java programming language**

Questions in this section relate to the partly completed project given below


```java
public class Student {
    private String name;
    private Date dob;
    private int idNo;
    private double fees;
    private double feesPaid;

    public Student(int id, String n){
        name = n;
        dob = new Date(0,0,1989);
        idNo = id;
        fees = 0;
        feesPaid = 0;
    }

    public int getIdNo(){
        return idNo;
    }

    public boolean hasPaid(){
        hasPaid(){

    }

    public void setDob(int dd, int mm, int yy){
        dob = new Date(dd,mm,yy);
    }

    // remaining code omitted
}
//continued below
```

```
public class CourseList  {
    private String name;
    private int code
    private ArrayList<Student> myCourseList = new ArrayList<Student>();

    public CourseList(String n, int c) {
        name = n;
        code = c;
    }

    public void addStudent(Student s){
        myCourseList.add(s);
    }

    public Student findStudent(int stNo){
        for (int index = 0; index < myCourseList.size(); index++){
            Student temp = myCourseList.get(index);
            if (stNo == temp.getIdNo()) {
                return temp;
            }
        }
        return null;
    }

    //remaining code omitted
}
```

Questions 16 - 22 are multiple choice questions and each has only ONE correct answer.
ONLY enter A - E .   You will get zero marks if you enter more than one answer.

16	Which of the following is TRUE: a) `Student` is a client of both `CourseList` and `StudentTest` b) `Student` is a client of `CourseList` and a supplier to `Date` c) `Student` is a supplier to both `StudentTest` and `Date` d) `Student` is a supplier to both `StudentTest` and `CourseList` e) `Student` is a supplier to `Date` and a client of `StudentTest` **Your answer letter:**	**2 marks**
17	Which of the following is FALSE a) `idNo` declares a field b) `public boolean hasPaid()` defines an accessor c) `public int getStudentNo()` defines a constructor d) `public void setFees(double f)` defines a mutator e) `private Date dob = new Date(1,1,1997)` declares a field **Your answer letter:**	2 marks

18	Which of the following is TRUE
	
	    a) A mutator usually changes field values
	    b) An accessor usually changes field values
	    c) A constructor never changes field values
	    d) An mutator usually returns a value
	    e) An accessor never returns a value
	
	Your answer letter:
		2 marks

19	Which is TRUE for the statement: `Student std1= new Student("Fred", 123);`
	
	    a) this statement is LIKELY to be found in the `Student` class
	    b) this statement is LIKELY to be found in the `Date` class
	    c) this statement is LIKELY to be found in the `StudentTest` class
	    d) this statement is NEVER be found in the `CourseList` class
	    e) this statement is ALWAYS be found in the `CourseList` class
	
	Your answer letter:
		2 marks

20	Which of the following is TRUE about definitions of methods called in `CourseList`
	
	    a) definition of `add()` in `addStudent()` can be found in `Student`
	    b) definition of `getIdNo()` in `findStudent` can be found in `Student`
	    c) definition of `getIdNo()` in `findStudent` can be found in `ArrayList`
	    d) definition of `get()` in `findStudent()` can be found in `ArrayList`
	    e) definition of `size()` in `findStudent()` can be found in `CourseList`
	
	Your answer letter:
		2 marks

21	The following statement is found in `StudentTest`
	    `Student student = new Student("Fred", 123);`
	Which of the following is TRUE
	
	    a) `student` is the class
	    b) `Student` is a call to a constructor
	    c) `Student()` is a call to a constructor
	    d) `Student()` is the `class`
	    e) `Student()` is an object of the `Student` class
	
	Your answer letter:
		2 marks

22	Which of the following is FALSE
	
	    a) An `ArrayList` must be created with a fixed size
	
	    b) Using an `ArrayList` would not cause a syntax error if `import java.util.*;` was included before the class definition
	
	    c) An `ArrayList` declaration requires the type of object to be stored
	
	    d) A item can be retrieved from an `ArrayList` using `get(itemIndex)`
	
	    e) Retrieving an item from an `ArrayList` using a field value requires code which performs a "search"
	
	Your answer letter:
		2 marks

Questions 23 - 28 are **NOT** multiple choice questions - you will be expected to provide written answers

23	Write the definition of a method `setFees()` to be added to the **Student** class, which sets the value of `fees` from a parameter value **Your answer:**	3 marks
24	Write the definition of a method `toString()` to be added to the **Student** class, which returns all of the information about a `Student` object as a `String` (in a suitable format) **Your answer:**	3 marks

25	This question is about the constructor in the **Student** class
	
	    i. write down the signature of the constructor
	
	    ii. explain how you know that it is a constructor
	
	    iii. explain its purpose
	
	Your answer:
	i.
	
	ii
	
	iii
		3 marks

26	Write the code to be added to the **StudentTest** class, which
	
	    i. declares a `Student` object called `ss9` and creates it with the student name: Angela and the id number : 9876
	
	    ii. which would output to the terminal window the name of a `Student` `ss2` (already declared and created previously)
	
	Your answer:
		4 marks

27	Define a method **findStudentByName()**, to be added to the **CourseList** class, which would return a `Student` whose name was given as a parameter value. (Note: the quickest way to do this is to copy/paste/edit for existing code) **Your answer:**	3 marks
28	a. Using appropriate examples to illustrate your answer, identify **ONE** way in which the **Java** programming language is similar to the **C/C++** programming languages **Your answer:** b. Using appropriate examples to illustrate your answer, identify **THREE** ways in which the **Java** programming language is different from the **C++** programming language **Your answer:** c. Explain the term "**Abstraction**" used in the context of object oriented design and provide an example of this from the case study above. **Your answer:**	10 marks

// END of Section B

// End of Assessment questions