



Rewarding Learning

ADVANCED
General Certificate of Education
2023

Centre Number

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Candidate Number

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Software Systems Development

Unit AS 1

Introduction to Object
Oriented Development



[SDV11]

SDV11

FRIDAY 26 MAY, MORNING

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all seven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

ADVICE TO CANDIDATES

You are advised to take account of the marks for each part question in allocating the available examination time.

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1 Complete the table by placing the Object Oriented **term** or **definition** in the relevant space provided.

Object Oriented Term	Object Oriented Definition
Object	
	A type of method within a class which is executed when an instance of the class is created.
Encapsulation	
Virtual method	

[2]

[1]

[3]

[2]

[Turn over



2 A local community centre has organised their annual outdoors activity trip. A maximum of 60 children can go on the trip. The community centre wants to record information about each child going on the trip. The cost of the trip is £900 for travel, accommodation and basic equipment. If a child needs additional equipment there is a £200 cost added.

The community centre has also set a maximum amount of spending money that a child can bring, which is £400.

Complete the design of a class called **Child** with:

- A parameterised constructor
- Get and Set (Properties / Methods) for the field **costofTrip**

```
class Child {  
    private int childID;  
    private string forename;  
    private string surname;  
    private bool equipNeeded;  
    private double amountPaid;  
    private double spendingMoney;  
    private int costofTrip;
```

(i) A field/parameterised constructor for the class Child

[5]



(ii) Get and Set (Properties / Methods) for the field **costofTrip** only.

[4]

(iii) Write the class method **TripCost** that will return the **costofTrip** due for a child.

[4]

[Turn over



(vi) A program using the class Child has the following line of code:

```
Child [ ] childArray = new Child[60];
```

Explain this line of code.

[4]



3 Software systems need to ensure that there is robustness included to prevent a system from inadvertently crashing.

(a) Name two Exceptions that could be trapped when developing an application.

[2]

(b) A method `convertToInt(string num)`, is designed to convert a value to an integer and output it. Write the code for the method `ConvertToInt(string num)`, which includes a try/catch, that will prevent the program from crashing if there is an error.

[5]



- 4 A new IT company is opening in Northern Ireland and requires 100 new employees. Employees will be provided with a unique username when they join the company to allow their details to be stored in the company's computer system. If this username is already taken by another employee, the company wants their system to provide an alternative username.

All current usernames are stored in an array called **Usernames**.

The employee will be asked to provide their forename and surname when the method is called.

The method should include:

- A username made from
 - o the first letter of the employee's forename
 - o all of their surname, and
 - o a random, 3-digit number attached to the end
- A check to ensure the username is unique
- A statement to return the valid username

The following lines of code will generate a random number from 100 to 999 to be attached to the username

C#

```
Random random = new Random();  
int number = random.Next(100, 999);
```

Java

```
Random random = new Random();  
int number = 100+random.nextInt(1000);
```

[Turn over



5 Many information systems need to sort stored data.

(a) (i) Choose a simple sorting method that can be used to sort data. Describe how this sort works.

[5]



(b) The following key terms are used when designing classes. Explain the terms below.

(i) Interface

[3]

(ii) Abstract class

[2]



- 6 City Vets is a local veterinary clinic that provides services for pets in the local community. City Vets offers pet check-ups with additional medical services. It also offers different levels of grooming services for dogs, cats and rabbits. It is important that all bookings are made at least one week in advance of the required appointment date to help City Vets manage the bookings.

Inheritance Diagram for City Vets

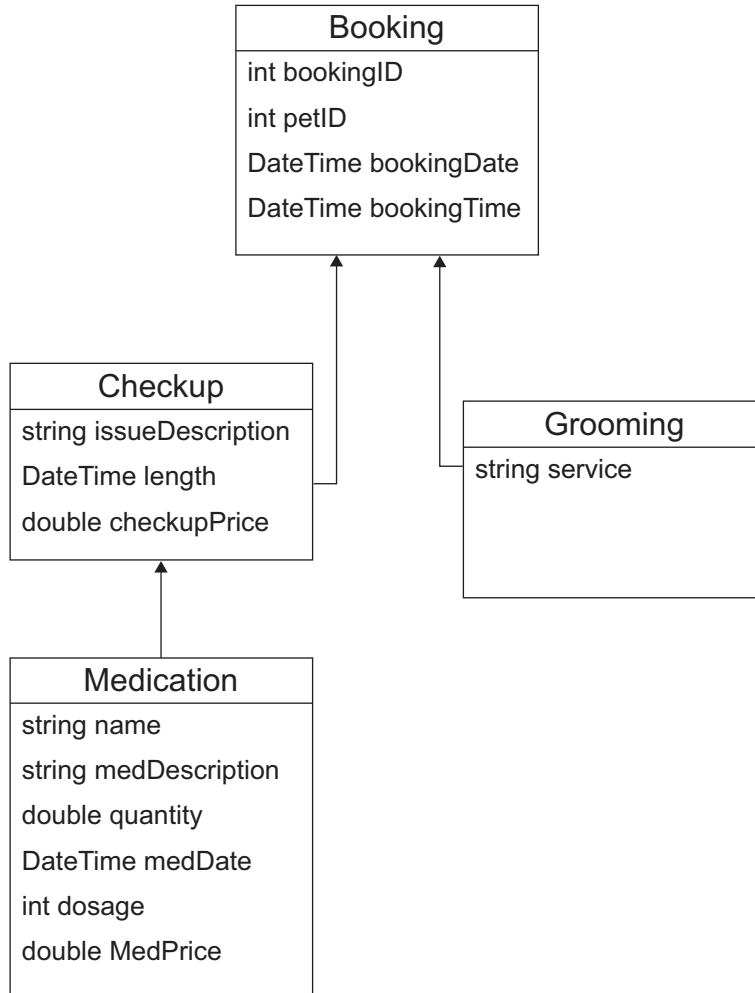


Fig. 1



(a) Inheritance is the term used to describe the process where a class is derived from another class.

Describe four ways in which **inheritance** benefits the Object Oriented Programming development process.

(i) _____

(ii) _____

(iii) _____

(iv) _____

[4]



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Question Number	Marks
1	
2	
3	
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Total Marks	
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Examiner Number

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