



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education

2016

Centre Number

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Candidate Number

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Software Systems Development

Unit AS1:

Introduction to Object Oriented Development



A1S11

[A1S11]

WEDNESDAY 25 MAY, AFTERNOON

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

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

Write your answers in the spaces provided in this question paper.

Answer **all six** 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.

For Examiner's use only			
Question	Marks available	Marks	Remark
1	6		
2	16		
3	27		
4	13		
5	24		
6	14		
Total	100		

- 1 The following statements relating to an object-oriented environment are either true or false. Write the word **true** or **false** beside each statement in the table below.

<p>The output from the following pseudo code is 43. <i>(method)</i> – void incrementNum(int numParam){ numParam++ } <i>(main method)</i> – void main(){ int numArg = 42 incrementNum(numArg) output numArg // writes 43 }</p>	
<p>Object is the base building block of an object-oriented system and all classes are derived from it.</p>	
<p>Overloading occurs where two methods have the same name and take the same list of parameters, even if they return different types.</p>	
<p>A derived / sub class inherits the properties, methods and events of the super / base class and can be customised with additional properties and methods.</p>	
<p>C# / Java implement multiple inheritance through the use of Interfaces.</p>	
<p>A primary concept of object-oriented programming is Polymorphism. It allows sub / derived class methods to be invoked through a super / base class reference during run-time. This is enabled through early binding.</p>	

[6]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

2 Decisions are one of the basic building blocks of structured software solutions. They allow branching to alternative processes. Write the code which would apply to the following scenarios. Declare and use meaningful variable names.

(a) Set a discount rate to 10% if a sale amount is greater than or equal to £75.00 and the customer does not have a rating of 'C'.

[5]

(b) Check if a sentence contains the word "the" and:

If true –

- Replace all occurrences of the word "the" with "a" or replace with "an" if the following word starts with a vowel.
- Output the modified sentence.

If false –

- Output the words "No Change".

Note. Assume the sentence does not begin with the word "the" and that only one space exists between each word.

Example: "A cow jumped over the anvil and the fence."

Examiner Only	
Marks	Remark

3 A company, Mourne Mountain Climbers, offers four packages to their clients with charges as shown in the table below.

Bookings are taken detailing the booking number, name of client, package type and the number in the party. A deposit of 10% of the booking cost is taken to confirm the booking and the booking is not recorded until the appropriate deposit is paid.

Package	Charge per person £
A : Two starter lessons	50.00
B : Three hour cliff climb with lesson	75.00
C : One day mountain climb trip	125.00
D : One week expert climbing tour	395.00

Note. If the client requires package C or package D and they have a party of 6 or more, a 15% surcharge is made to cover extra staff and fuel for a larger mini-bus.

(a) Complete the design of a class called **Booking** shown below.

Ensure the creation of:

- A constructor method with fields;
- **GET** and **SET** (Properties / Methods) for the field **noInParty** only;
- **Methods** to determine appropriate costs.

```
class Booking{
    private      int      bookingNo;
    private      String   clientName;
    private      char     package;
    private      DateTime bookingDate;
    private      int      noInParty;

    public Booking(){
        bookingNo = 0;
        clientName = null;
        package = ' ';
        bookingDate = new DateTime();
        noInParty = 0;
    }
}
```

Examiner Only

Marks Remark

4 (a) Testing is an important stage of software development. The data used and the processing of this data must be correct.

All data entered should be tested to ensure correctness before storage and use.

(i) Name **three** types of check which should be considered for data entry.

[3]

(ii) For **one** of the Booking class fields defined below from **Question 3**, indicate which checks should be applied to test the validity.

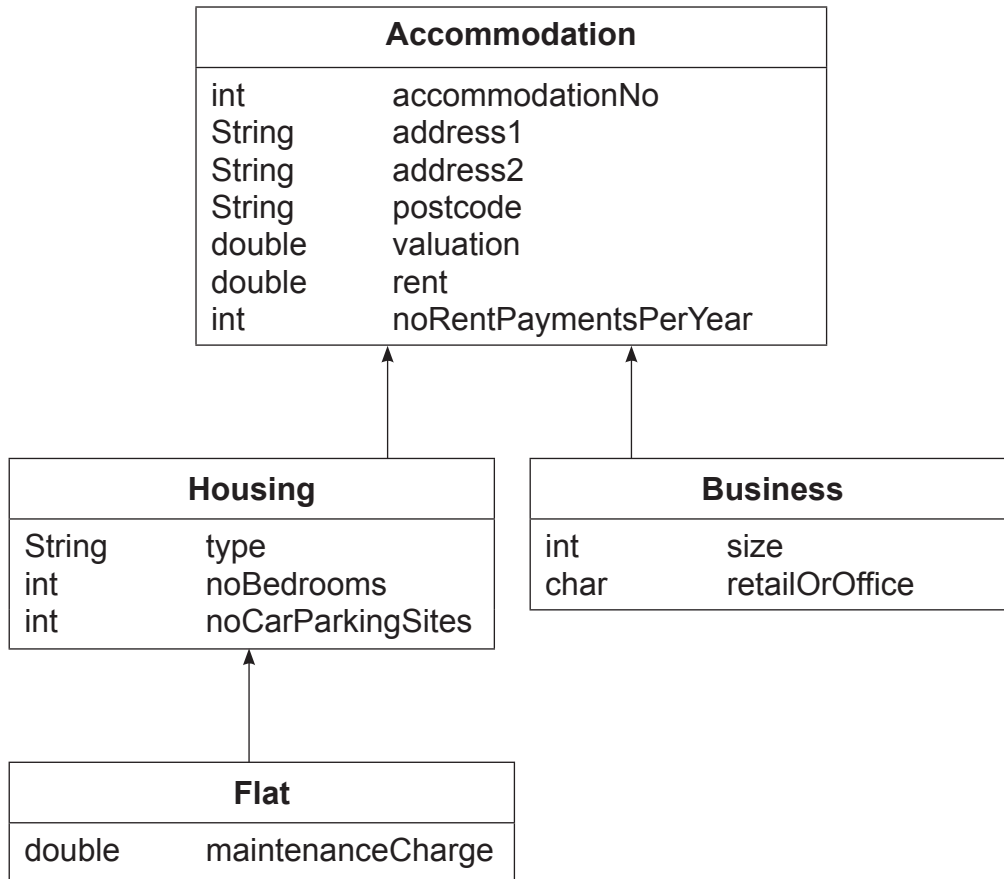
```
class Booking{
    private int bookingNo;
    private String clientName;
    private char package;
    private DateTime bookingDate;
    private int noInParty;
```

[1]

Examiner Only	
Marks	Remark

- 5 A property developer, Peter McKenna, has a portfolio of various types of accommodation for rent. He currently holds details of detached houses, semi-detached houses, terraced houses, flats and business premises on his books.

Inheritance diagram for PMK Rentals.



The header for the class **Accommodation** has been defined as follows:

abstract class Accommodation

- (a) Explain the term in bold and why it has been applied to the class.

[3]

Examiner Only	
Marks	Remark

(b) Assume the class **Accommodation** has been designed with the following elements:

- field definitions;
- default and field constructors;
- GET and SET (Properties / Methods);
- toString() method.

Write the code for an additional method, **incomeYear()**, that will return the annual income.

Annual income is calculated as rent multiplied by noRentPaymentsPerYear.

[2]

Examiner Only	
Marks	Remark

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