

ECS401: PROCEDURAL PROGRAMMING  
Autumn 2020 EXIT TEST  
**PART 1 (THEORY) OF 2**

Student Number from ID card: \_\_\_\_\_

(eg 201234567)

Student Surname: \_\_\_\_\_

Student Other names: \_\_\_\_\_

WRITE YOUR **FULL** NAME IN BLOCK CAPITALS

Time allowed for part 1 and 2 combined: 90 minutes + 45 mins submission time.

**YOU MUST COMPLETE THE TEST ON YOUR OWN, WITHOUT CONSULTING OTHERS***Answer ALL of the (multi-part) questions in the TWO booklets.**There are **two** questions made of several parts on this test paper.**The paper is worth 25 marks, though the marks are given only for feedback and to help you plan timing and amount to write on this test.**The mark for the first (theory) question (1a, 1b) are combined and converted to a distinct A-F grade. The mark for the final (programming) question part 2 is also converted to a distinct A-F grade. Each counts separately towards your coursework grade.*

Answer the questions in accordance with the instructions given with each question.

**READ THE INSTRUCTIONS OVERLEAF**

For examiner's use only

Question 1a+1b	
Mark /15	Grade
14-15	A+
12-13	A
10-11	B
8-9	C
6-7	D
3-5	F
0-2	FM

$$1a \text{ _____ } + 1b \text{ _____ } = \text{ _____ } \\ \text{TOTAL}$$

## INSTRUCTIONS

*SAVE YOUR WORK REGULARLY.*

You must upload TWO PDF documents containing your answers to QM+ containing your answers: ONE FOR THE THEORY PAPER, ONE FOR THE PRACTICAL PAPER.

Follow the instructions on the submission pages of QM+ to submit your work. You can also use the backup method to submit a second backup copy of the file by a second method - see the instructions on the submission page.

Before submission, rename your answer booklet pdf files to include your surname and student identifier at the start of the file name, ie the file named should have the form:

SurnameStudentIdExit2020P1.pdf  
SurnameStudentIdExit2020P2.pdf

For example, mine would be

Curzon201234567Exit2020P1.pdf  
Curzon201234567Exit2020P2.pdf

You can refer to textbooks, notes and online materials to facilitate your working, but normal referencing and plagiarism rules apply and you must cite any sources used. Note on this paper there are NO marks for writing or code copied from other sources or written by someone else: everything must be your own work. If you show your work to others and they copy it you will get 0 too.

**Your answers MUST be typed into the pdf forms. You MUST NOT cut and paste images - images will NOT be marked. Lines of text that exceed the number of lines provided in each box will not be marked.**

Calculators are permitted in this test. You may also compile and run code. However, note that the focus on marking dry run questions is on the explanations/justifications not the values printed. The focus on marking code is on whether the code is logically correct, together with the explanations of it, rather than on minor details of syntax that might be picked up by a compiler.

Put your effort in to making sure code is logically correct and explaining how it works in detail. READ ANY CODE YOU WRITE CAREFULLY TO CHECK IT IS LOGICALLY CORRECT.

### **WORD LIMITS**

*The word limits for each question part are advisory maximums, linked to the number of marks. You can easily gain full marks writing within this limit. We are looking for well-explained but appropriately concise answers. You will NOT get more marks by writing significantly more than the limit.*

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## Question 1 [15 marks]

*There are NO marks for work cut and pasted from other sources  
(or using the same wording as someone else).*

- a) **Compare and contrast arrays and records** (ie explain their similarities and differences) **in your own words illustrating** your answer using examples from the following code fragments.

You may assume that `inputInt` is a method that inputs an integer value from the user

```
class Animal
{
    String name;
    int weight;
}

public static void zoo ()
{
    int[] ages = new int[3];
    for(int i = 0; i<ages.length; i++)
    {
        ages[i] = inputInt("Age? ");
        System.out.println(ages[i]);
    }

    Animal elephant = new Animal();
    elephant.name = "Jumbo";
    elephant.weight = inputInt("Weight? ");
    System.out.println(elephant.weight);

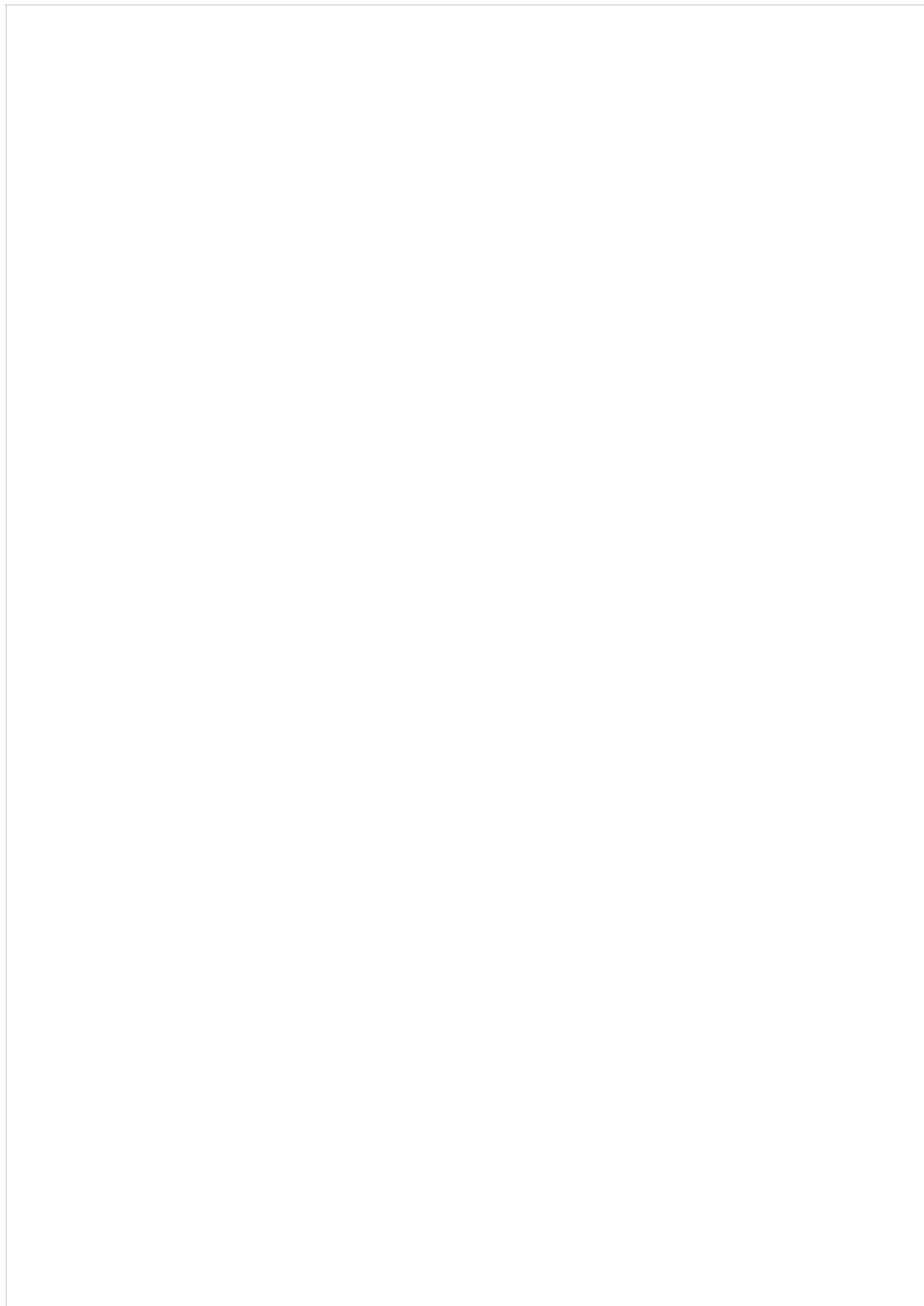
    return;
}
```

**[6 marks]**

**Write your answer overleaf**

Answer to question 1a

[word limit: 400 words]



**MARK** \_\_\_\_\_ / 6

*There are NO marks for work cut and pasted from other sources  
(or using the same wording as someone else).*

**1b) Complete the dry run table for each fragment of code given in the question sub-parts that follow. Give the value(s) printed out when each is executed. Justify your answers by explaining in your own words the execution of the code.**

**[9 marks]**

i)

```
String message = "Hello";
int a = 14;
int b = 10;
a = b;
b = a + 1;

if (b >= 12)
{
    message = "Goodbye";
}
else if (b >= 14)
{
    message = "Au revoir";
}
else
{
    message = "Adios";
}

System.out.println(a + ":" + b + ":" + message);
```

[ 3 Marks]

**Answer to question 1b i):**

**Complete the dry run table (you may not need all rows):**

message	a	b	b>=12?	b>=14?



Write EXACTLY what is printed here



Explain in your own words what the code does step by step here:

*[word limit: 300 words]*



*There are NO marks for work cut and pasted from other sources  
(or using the same wording as someone else).*

ii)

```
int count = 1;
while (count != 9)
{
    System.out.println(count);
    count = count + 4;
}
```

[3 Marks]

**Answer to question 1b ii):**

**Complete the dry run table (you may not need all rows):**

count	count != 9 ?	printed



Write EXACTLY what is printed here



Explain in your own words what the code does step by step here:

*[word limit: 300 words]*





iii)

*[3 Marks]*

**Complete the dry run table (you may not need all rows):**



Write EXACTLY what is printed here



Explain in your own words what the code does step by step here:

*[word limit: 300 words]*



**MARK** \_\_\_\_\_ / 9

***YOU MUST ALSO ANSWER QUESTION 2 IN BOOKLET 2***