

**Birkbeck**  
**(University of London)**

**BSc/FD MOCK EXAMINATION**

**Department of Computer Science and Information Systems**

**Introduction to Programming (BUCI007H4)**

**CREDIT VALUE: NONE**

**SUMMARY ANSWERS**

**Date of examination: Tuesday 3rd December 2019**

**Duration of paper: 1 hour and 20 minutes**

**The programming language is PYTHON.**

**Write your name** at the top of this question paper.

There are **seven** questions in this paper.

Answer all **seven** questions.

Each question carries **10** marks in total.

Calculators and other electronic devices are not permitted.

The examination is closed book.

No supplementary material is provided.

This paper is not prior disclosed.

The quote marks for strings are in this style "string".

1. (a) Which of the following are accepted by the compiler as names of variables and which are not accepted?

- i)  $x$
- ii)  $5x$
- iii)  $x5$
- iv) "variable"
- v) "VARIABLE"

(5 marks)

*Answer: i) yes; ii) no; iii) yes; iv) no; v) no. One mark for each correct answer, making a total of five marks.*

- (b) Consider the following code.

```
a = 5
b = 3
c = a+b/2
d = a+b//2
```

What are the values of **c** and **d**? (5 marks)

*Answer:  $c = 6.5$ , two marks, and  $d = 6$ , three marks, making a total of five marks*

2. (a) State one advantage in using pseudo code to design an algorithm. (4 marks)

*Answer: it enables the key points of the algorithm to be worked out without being distracted by the details of an implementation. Any reasonable answer accepted. Four marks.*

- (b) A program contains a variable **n** equal to the number of litres of petrol in the fuel tank of a car and a variable **fe** equal to the fuel efficiency of the car in miles per litre. Let **d** be the distance in miles that the car can go with the petrol in the tank. Show how **d** can be calculated from **n** and **fe**. (3 marks)

*Answer:  $d = n*fe$ . Three marks.*

- (c) Let **price** be the price of petrol in pounds per litre and let **c** be the cost in pounds of 100 miles of travel. Show how **c** can be calculated from **price** and **fe**. (3 marks)

*Answer:  $c = price*100/fe$ . Three marks.*

3. Find five errors in the following code.

```
print("balance", balance)
balance = 10,000      # pounds sterling
rate% = 5             # per cent
interest = balance*rate%/100
newBalance = balance+interest
print(The new balance is ", newBalance)
```

(10 marks)

*i) balance is used before it is assigned a value; ii) the comma in 10,000; iii) the % in the variable name rate%; iv) missing double quote in the print statement; v) incorrect spelling, newBalance. Two marks each, making a total of 10 marks.*

4. (a) Evaluate the following expressions.

- i) "Hello"[0]
- ii) "Hello"\*3
- iii) len("Hello")
- iv) len("A\H")
- v) str(5)

(5 marks)

*Answer: i) "H"; ii) "HelloHelloHello"; iii) 5; iv) 3; v) "5". One mark each, making a total of five marks.*

- (b) The following statement is used to read in from the keyboard the number of cans in a pack of cans.

```
numberCans = int(input("Enter the number of cans per pack: "))
```

Explain why the function int is required on the right hand side of the above statement.

(5 marks)

*Answer: The function input returns a string. The function int is required to convert the string to an integer. Five marks.*

5. (a) Consider the following statements.

```
price = 23.161
print(price)
print("%.2f" % price)
```

Describe the print out when the above statements are executed. (5 marks)

*Answer: 23.161, two marks, and 23.16, three marks, making a total of 5 marks.*

- (b) It is required to print a list of integers. Each integer is non-negative and strictly less than 1000. What is the minimum width of field that should be used for printing out the integers? Justify your answer. (3 marks)

*Answer: Three characters. Three marks. Two marks for a correct answer with no justification.*

- (c) Consider the following two print statements.

```
print("first: %3d" % 5)
print("second: %3d" % 7)
```

Show how one of the format specifiers can be edited to ensure that the two numbers 5 and 7 in the print out are aligned vertically. (2 marks)

*Answer:*

```
print("first: %4d" % 5)
print("second: %3d" % 7)
```

*or*

```
print("first: %3d" % 5)
print("second: %2d" % 7)
```

*Either answer accepted. Two marks.*

6. (a) Evaluate the following expressions.

- i)  $4 > 3$
- ii)  $0 < 200$  and  $200 < 100$
- iii)  $0 < 200$  or  $200 < 100$
- iv) `"string" == "string"`
- v) `False == True`

(5 marks)

*Answer: i) True; ii) False; iii) True; iv) True; v) False. One mark each, making five marks in total.*

- (b) Let  $x$  and  $y$  be two variables with values of type `int`. Write out a Boolean expression that has the value `True` if and only if at least one of  $x$  and  $y$  is zero. (5 marks)

*Answer:  $x == 0$  or  $y == 0$ . Five marks. Any reasonable version accepted.*

7. The following code assigns a value "A", "B" or "C" to the variable `grade`. This assignment depends on the variable `mark` to which a suitable value has already been assigned.

```
grade = "C"  
if mark >= 70 :  
    grade = "A"  
if mark >= 50 :  
    grade = "B"
```

- (a) Describe the error in the above code. (4 marks)

*Answer: if the mark is 70 or greater then the assigned grade is "B", not "A". Four marks.*

- (b) Write out a correct version of the above code using the `if...elif...else` construction for nested if statements. The assignment `grade = "C"` must be placed within the nested if statements. (6 marks)

*Answer:*

```
if mark >= 70 :  
    grade = "A"  
elif mark >= 50 :  
    grade = "B"  
else :  
    grade = "C"
```