

2 hrs

**UNIVERSITY OF MANCHESTER
SCHOOL OF COMPUTER SCIENCE**

Introduction to Programming 1

January 2021

Answer all questions

1. What is the output of the following code?

```
1 pi = 3.14
2 name = "CouchCoder"
3 num = 5
4 print(type(pi), type(name), type(num))
```

(1 mark)

- A. 3.14, CouchCoder, 5
- B. <class 'float'> <class 'str'> <class 'int'>
- C. 'float' 'str' 'int'
- D. None of these

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2. What is the output of the following code?

```
1 print(bool(1), bool(0))
```

(1 mark)

- A. 1 0
- B. False True
- C. True False
- D. 1,0

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3. Which of the following statements is False about variables? (1 mark)

- A. All of the statements are true
- B. Variables can contain letters, numbers and underscores
- C. Variables can be one of the reserved Python keywords
- D. Variables must begin with a letter

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4. What is the output of the following code?

```
1 print(3+3==6 or 1+5==6)
```

(1 mark)

- A. True or True
- B. True
- C. None of these
- D. False

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5. Which of the following correctly increments the integer variable (e.g. num = 5) by 1? (1 mark)

- A. num++
- B. num+=1
- C. num+=1
- D. More than one choice is correct

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6. Which of the following is true?

(1 mark)

- A. The equal to operator (==) is used for assignment
- B. The equal to operator (=) is used for comparison
- C. The not equal to operator is <>
- D. None of these

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7. What is the output of the following code?

```
1 mul = 2*2
2 exp = 2**2
3 print(mul + exp)
```

(1 mark)

- A. 8
- B. 12
- C. 24
- D. None of these

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8. What function would add Kevin to the end of the array of names?

```
names = ['Mike', 'James', 'Derrick'] \mks{1}
```

- A. names(Kevin)
- B. names.add('Kevin')
- C. names.append('Kevin')
- D. names.insert('Kevin')

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9. In the following array what is the value of names[2]?

```
names = ['Mike', 'James', 'Derrick', 'Freddie', 'John'] \mks{1}
```

- A. Mike
- B. James
- C. Derrick
- D. Freddie

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10. What is the correct way to print the e in CouchCoder?

(1 mark)

- A. print("CouchCoder"[7])
- B. print("CouchCoder"[8])
- C. print("CouchCoder"[9])
- D. None of these

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11. Given the following program, what does the program do?

```
1 user_input = "silly strings" #input("Enter a string: ")
2
3 c = 0
4 for s in user_input:
5     c+=1
6 print("c", c)
```

(1 mark)

- A. Displays the number of characters in "silly strings"
- B. Displays the number of s characters in "silly strings"
- C. Replaces "silly strings" with user input, then displays the user input
- D. Displays "silly strings"

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12. What does the following program do?

```
1 import re
2
3 dob = 'Users Date of Birth is: 17/01/1975'
4 p = '\d+'
5 result = re.findall(p, dob)
```

(1 mark)

- A. Extracts the digits from the variable dob as a list of strings named result
- B. Extracts the digits from the variable dob as a list of integers named result
- C. Extracts 17/01/1975 from dob and stores as a string named result
- D. Extracts 17011975 from dob and stores as a string named result

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13. What is wrong with the following program?

```

1  dob = (12,10,1979)
2  print(dob)
3  validate = input("Is this your date of birth?")
4
5  if 'n' in validate or 'N' in validate:
6      print("resetting date of birth")
7      dob[0] = 0
8      dob[1] = 0
9      dob[2] = 0
10
11 print(dob[0],dob[1],dob[2])

```

(1 mark)

- A. You are not allowed to update values in dob
- B. dob[0], dob[1] and dob[2] have not been defined
- C. Nothing, the program will work fine
- D. The values in dob should be enclosed in quotes

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14. Given the following regular expression which of the following is a valid match?

`^400$|^[1-9]0$|^[1-3]\d0$`

(1 mark)

- A. 40
- B. 4005020
- C. 453
- D. 4110

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15. Given the following regular expression which is a valid match?

`^.{,5}$`

(1 mark)

- A. abcde
- B. 555555
- C. 444444
- D. 012345

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16. When programming using object-oriented methods in Python, when might you use a static method? (1 mark)

- A. When there is no need to access any of the attributes of the method
- B. When you only want to access attributes of the method for reading (not assigning or updating)
- C. When you only want to access attributes of the method for reading or assignment (not updating)
- D. When you want to declare a method outside of the class

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17. What can be useful as a quick, throwaway single line function?

(1 mark)

- A. A Lambda function
- B. A Class function
- C. A Static function
- D. A Null function

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18. What is stored in `ss` once the following code has completed?

```
1 def s(n):  
2     t = 0  
3     for x in n:  
4         t += x  
5     return t  
6 ss = s([8, 2, 3, 0, 7])
```

(1 mark)

- A. 20
- B. 8
- C. 7
- D. t

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19. If the user entered the value 15, what would be the output from the following code?

```
1 def my_inappropriately_named_function (num):  
2     """This function does something but  
3     what does it do?"""  
4     if num > 1:  
5         my_inappropriately_named_function(num // 2)  
6     print(num % 2, end='')  
7  
8 number = int(input("Enter an integer: "))  
9 my_inappropriately_named_function(number)
```

(1 mark)

20. Produce python pseudocode for a game of 10 pin bowling. For every frame the user is prompted to input the players score in turn. There are 4 players (Patrick, Laura, Joseph and Steph) in the game.

General rules of bowling:

- A game consists of 10 frames. In each frame the player rolls 1 or 2 balls, except for the 10th frame, where the player rolls 2 or 3 balls
- The total score is the sum of your scores for the 10 frames
- If you knock down fewer than 10 pins with 2 balls, your frame score is the number of pins knocked down
- If you knock down all 10 pins with 2 balls (spare), you score the amount of pins knocked down plus a bonus - amount of pins knocked down with the first ball on their next turn
- If you knock down all 10 pins with 1 ball (strike), you score the amount of pins knocked down plus a bonus - amount of pins knocked down with both balls on their next turn
- As the 10th frame is the last one, in case of spare or strike there will be no next balls for the bonus. To account for that:
 - If the last frame is a spare, player rolls 1 bonus ball.
 - If the last frame is a strike, player rolls 2 bonus balls.
 - These bonus balls on 10th frame are only counted as a bonus to the respective spare or strike.

Note: You may assume that the input is always valid. You must use one function in your program. (20 marks)

21. The following code contains 5 errors. Identify the line number where the error occurs and provide a brief explanation of how to fix it. You do not need to add any additional lines or provide updated code.

```

1  from tkinter import Tk
2  from time import sleep
3  from random import randint as rand
4  window = Tk()
5  window.title("The window")
6  canvas = Canvas(window,width=400,height=400, bg="black")
7  num_squares = input("How many squares?")
8  square = []
9  colour = ["red", "yellow", "green", "blue"]
10
11 for i in range(num_squares):
12     c_col = rand(0,3)
13     x = rand(10, 300)
14     y = rand(10, 300)
15     xy = (x, y, x+10, y+10)
16
17     square.append(canvas.create_rectangle(xy, fill=colour[c_col]))
18 canvas.pack
19
20 x = [1] * num_squares
21 y = [1] * num_squares
22
23 while True:
24     for i in range(num_squares):
25         pos = canvas.coords(square[i])
26         if pos[3] > 400 or pos[1] < 0:
27             y[i] = -y[i]
28         if pos[0] < 0 or pos[2] > 400:
29             x[i] = -x[i]
30
31     for j in range(num_squares)
32         if i = j: continue
33         pos2 = canvas.coords(square[j])
34         if pos[0] < pos2[2] and pos[2] > pos2[0] and pos[1] < pos2[3] and pos[3] > pos2[1]:
35             y[i] = -y[i]
36             x[i] = -x[i]
37             y[j] = -y[j]
38             x[j] = -x[j]
39     canvas.move(square[i], x[i], y[i])
40     sleep(0.002)
41     window.update()
42 window.mainloop()

```

(10 marks)

22. Given the code below. Explain each line of code starting with the first instruction that is executed and then follow the flow of execution.

```
1  def my_inappropriately_named_function (num):  
2      """This function does something but  
3          what does it do?"""  
4      if num > 1:  
5          my_inappropriately_named_function(num // 2)  
6          print(num % 2, end='')  
7  
8  number = int(input("Enter an integer: "))  
9  my_inappropriately_named_function(number)
```

(11 marks)