**Information and Computer Science Department**

**ICS 104: Introduction to Programming in Python and C**

**Midterm Exam, Term 213**

**Thursday, June 30, 2022**

**Duration: 150 minutes**

**Code 001**

**Name:**

|  |  |  |  |  |  |  |  |  |  |
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| **ID:** |  |  |  |  |  |  |  |  |  |

**Instructor Section: Select one**

|  |  |
| --- | --- |
| **Instructor** | **Section** |
| Dr ADAM SALAHADIN | [ ] 1 (UMTW 8:10 – 9:00) |
| Dr. WASFI AL-KHATIB | [ ] 2 (UMTW 9:20 – 10:10) |
| Dr. MAHMOOD NIAZI | [ ] 3 (UMTW 10:30 – 11:20)  [ ] 13 (UMTW 1:00 – 1:50)  [ ] 14 (UMTW 12:00 – 12:50) |
| Dr. HUSNI AL-MUHTASEB | [ ] 4 (UMTW 12:00 – 12:50)  [ ] 11 (UMTW 9:20 – 10:10)  [ ] 12 (UMTW 11:00 – 11:50) |
| Dr. AHMAD AL-HERZ | [ ] 5 (UMTW 13:00 – 13:50)  [ ] 7 (UMTW 9:20 – 10:10)  [ ] 9 (UMTW 12:00 – 12:50) |
| Mr. YAHYA GAROUT | [ ] 15 (UMTW 8:10 – 9:00) |

**Instructions**:

* Write your name, ID, and Section # on
  + This page.
  + The upper left corner of the green answer sheet.
* Bubble your ID, Section number and Test Code number on the green sheet, and make sure that the bubbles match with the numbers that you wrote/checked on this page.
* Write your name and ID number on the white Answer Sheet.
* **Part 1.** Use the green sheet to answer the multiple choice questions.
  + Use HB2.5 pencils only.
  + Use a good eraser. DO NOT use erasers attached to the pencil. If you erase a bubble, make sure that you do not leave any trace of penciling.
  + When bubbling your answers, make sure that the bubbled space is fully covered.
* **Part 2.** Use the white answer sheet to answer the Code Writing questions.
* The exam is closed book and closed notes.
* Make sure that the exam consists of 14 pages (including this page).
* All types of calculators, pagers or mobile phones are not allowed during the exam.
* Make sure to turn off your mobile phone and keep it under your seat.

**Part 1 : MCQ questions [ 50 x 1.5 = 75 points ]: (Make sure to bubble the correct answer in the green sheet)**

1) Which of the following Python expressions gives the same result as:

**"C" < "T"**

|  |  |
| --- | --- |
|  | **"C"\*2 < "C"+"D"** |
|  | **"C" - "T" < 0** |
|  | **"C" + 1 < "T" + 1** |
|  | **"C" < "A"** |

2) Given this code fragment, what is the output result when the user enters 1**5.9** as input?

value = float(input("Enter a value:"))

value = int(value)

print(value)

|  |  |
| --- | --- |
|  | 15 |
|  | 16 |
|  | 15.9 |
|  | 15.0 |

3) Given this code fragment, what is the output when the user enters 9**.2** as input?

value = float(input("Enter a value:"))

value = str(value)

value = value + " SAR"

print(value)

|  |  |
| --- | --- |
|  | SAR |
|  | 9.2 SAR |
|  | 9.2 |
|  | An error message will be displayed |

4) What will be the output of the following code fragment?

week = week - 1

sent = "hello week" + str(week)

print(sent)

|  |  |
| --- | --- |
|  | The code will result in an error. |
|  | hello week |
|  | hello week1 |
|  | hello week week - 1 |

5) For the following mathematical formula, which expression is equivalent in Python?

|  |  |
| --- | --- |
|  | S = 5 \* x + x \* y \*\* 3 + abs(r) / x - 5 |
|  | S = (5 \* x + x \* y \*\* 3 + abs(r)) / (x – 5) |
|  | S = (5 \* x) + (x \* y \*\* 3 + abs(r))/(x - 5) |
|  | S = ((5 \* x) + x \* y \*\* 3 + abs(r))) / x - 5 |

6) Which one of the following is a **valid** variable name in Python?

|  |  |
| --- | --- |
|  | for |
|  | !grade |
|  | 4\_rent |
|  | \_z2 |

7) What will be the output of the following code fragment?

courseName = "ICS" + "104" + "1"

courseName = courseName + "Python and C"

print(courseName)

|  |  |
| --- | --- |
|  | ICS1041python and C |
|  | Python and C |
|  | ICS1041Python and C |
|  | The code will result in an error. |

8) What will be the value of the variable **myValue** after executing this statement?

myValue = (543 // 10) % 10

|  |  |
| --- | --- |
|  | 5 |
|  | 0 |
|  | 543 |
|  | 4 |

9) Given this line of code, what is the output?

print((1 + 2) \* 2 \*\* 3 % 4)

|  |  |
| --- | --- |
|  | 24 |
|  | 0 |
|  | 5 |
|  | 9 |

10) What will be the value of the variable **total** after executing the following statement?

total = 3 \*\* 3 \*\* 3 + 6

|  |  |
| --- | --- |
|  | 214 |
|  | 6 + 93 |
|  | 93 |
|  | 327 + 6 |

11) Consider the following Python code

name = "CHEM 101"

id = 202012134

Choose the correct answer

|  |  |
| --- | --- |
|  | print(name.isupper()) will display True |
|  | print(name.isspace()) will display True |
|  | print(name.isalnum()) will display True |
|  | print(id.isdigit()) will display True |

12) Given this line of code, what is the output?

print(5 \* 2 \*\* 2 // 2)

|  |  |
| --- | --- |
|  | 50 |
|  | 0 |
|  | 15 |
|  | 10 |

13) Which of the following is the correct condition that would return True if the substring **"ICS"** does not exist in **courseName** string variable?

courseName **=** "This course is ICS104"

|  |  |
| --- | --- |
|  | courseName not in "ICS" |
|  | "ICS" not in courseName |
|  | "ICS".find(courseName) |
|  | "ICS".count(courseName) |

14) Which of the following statements is true about the **if** statement in Python?

|  |  |
| --- | --- |
| a) | The **if** and the **else** can be aligned to different indentation levels |
| b) | The **if** block is optional |
| c) | The **else** block is optional |
| d) | The **if** statement can have only one condition that evaluates to an integer value |

15) What is the output of the following Python code fragment?

myAddress = "Musab Ibn Umair Road"

newAddress = ""

for i in range(1, len(myAddress)) :

if not myAddress[i].islower() :

newAddress = newAddress + myAddress[i]

print(newAddress)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a) | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | I |  | U |  | R | |
| b) | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | M |  | I |  | U |  | R | |
| c) | |  |  |  |  | | --- | --- | --- | --- | | M | I | U | R | |
| d) | |  |  |  | | --- | --- | --- | | I | U | R | |

16) What will be the output of the following python code?

input1 = input(“Enter a number::”) #Consider user input as 12

input2 = 13

print(int(input1) + input2)

|  |  |
| --- | --- |
| a) | input1+input2 |
| b) | input1+13 |
| c) | 12+input2 |
| d) | 25 |

17) Evaluate the following expression

6!= 8+10/3 and not not 5>2

|  |  |
| --- | --- |
| a) | False |
| b) | Run time error |
| c) | Compile time error |
| d) | True |

18) Which of the following is correct, if the user wants to input the price of a certain product and store it as a floating-point number in the variable cost?

|  |  |
| --- | --- |
| a) | num = float("Enter the price: ") cost = num |
| c) | num = input("Enter the price: ") cost = num |
| c) | num = input("Enter the price: ") cost = float(num) |
| d) | None of the answers is correct |

19) Consider the following Python code:

x = input(“Enter the value of x: “)

y = input(“Enter the value of y: “)

print(x+y)

When the code is run, the user input for x is 2 and that for y is 4, in respective prompt. Then the output will be:

|  |  |
| --- | --- |
| a) | 2 |
| b) | 6 |
| c) | 2+4 |
| d) | 24 |

20) How many times does the following code fragment execute the “print(num)” statement, if the user enters the numbers 1, 8, 2, 4, 0 in the same order?

num = -1

while num!= 0:

num = int(input("Enter a positive integer"))

if num % 2 == 0:

print(num)

|  |  |
| --- | --- |
| a) | 3 |
| b) | Infinite loop |
| c) | 4 |
| d) | 5 |

21) Which of the following is the correct conditional statement in Python?

|  |  |
| --- | --- |
| a) | if a<=100: |
| b) | if (a<=10) |
| c) | if (a>=200) |
| d) | None of the above |

22) What will be the random numbers generated by the following code?

from random import randint

randomNum = randint(1,5)

|  |  |
| --- | --- |
| a) | 1 - 4 |
| b) | 0 - 5 |
| c) | 0 - 4 |
| d) | 1 – 5 |

23) Identify the output of the given Python code.

a = int(input(“Enter an integer: ”)

b = int(input(“Enter an integer: ”)

if a<=0:

b = b+1

else:

a = a+1

|  |  |
| --- | --- |
| a) | if inputted number for a is a negative integer then b = b +1 |
| b) | if inputted number for a is a positive integer then a = a +1 |
| c) | Both options (a) and (b) described above |
| d) | None of the above |

24) What is the value of variable c after running the following Python code?

c = 2

b = 1

if b == 0:

c = c+1

else:

c = c-1

|  |  |
| --- | --- |
| a) | 2 |
| b) | 1 |
| c) | 4 |
| d) | 3 |

25) What will be the output of the following python code?

s1 = "2"

s1 = s1 \* 2

s2 = len(s1) \* int(s1)

print(s1, s2)

|  |  |
| --- | --- |
| a) | 22 44 |
| b) | 11 22 |
| c) | 2 4 |
| d) | Syntax error |

26) What will be the output of the following python code?

age = 15

if age >= 0 and age <= 16:

print("Age Group : Child")

elif age <= 30:

print("Age Group : Young Adults")

else:

print("Age Group : Middle-aged Adults")

else:

print("Age Group : Old-aged Adults")

|  |  |
| --- | --- |
| a) | Age Group : Young Adults |
| b) | Age Group : Child |
| c) | This code will generate an error |
| d) | Age Group : Middle-aged Adults |

27) What will be the output of the following python code?

n = 11

y = 15

x = True

if n > 6:

    if y !=n or x:

        if x == False:

            print("x is False")

        else:

            print("x is True")

    else:

        print("y less than n")

else:

    print("n less than 6")

|  |  |
| --- | --- |
| a) | n less than 6 |
| b) | x is False |
| c) | x is True |
| d) | y less than n |

28) What will be the output of the following python code?

x = True

y = False

z = False

if not x or y:

print(1)

elif not x or not y and z:

print(2)

elif not x or y or not y and x:

print(3)

else:

print(4)

|  |  |
| --- | --- |
| a) | 1 |
| b) | 2 |
| c) | 3 |
| d) | 4 |

29) What will be the output of the following python code?

num = 14

if num/3==4:

print("Divisible by 4.")

elif num/7==2:

print("Divisible by 7.")

else:

print("Divisible by 2.")

|  |  |
| --- | --- |
| a) | Divisible by 4. |
| b) | Divisible by 7. |
| c) | Divisible by 2. |
| d) | No output is printed. |

30) What is the output of the following code?

x = 0

while x < 4:

x = x + 1

print("x is", x)

|  |  |
| --- | --- |
|  | x is 5 |
|  | x is 3 |
|  | x is 4 |
|  | x is 6 |

31) What will be the output of the following python code if the user enters 5 as input?

num = int(input("Enter a number: "))

if num > 5:

print("X")

else:

if num > 3:

print("Y")

else:

print("Z")

|  |  |
| --- | --- |
| a) | X |
| b) | Y |
| c) | X |
| d) | X  Z |

32) Evaluate the following expression

30//4/2

|  |  |
| --- | --- |
| a) | 3.0 |
| b) | 15 |
| c) | 2 |
| d) | 3.5 |

33) How many times will the following code print "Python"?

count = 0

while count < 10:

print("Python")

|  |  |
| --- | --- |
|  | 9 |
|  | 10 |
|  | 11 |
|  | Infinite |

34) What is the value of the following Python expression?

"4" \* 2 + str(4) \* 2

|  |  |
| --- | --- |
| a) | 4444 |
| b) | 44 |
| c) | This code will generate an error |
| d) | 4 4 4 4 |

35) What will be the output of the following python code?

i = 0

while i < 2:

print(i)

i += 1

print(0)

|  |  |
| --- | --- |
| a) | 0 1 |
| b) | 1  0 |
| c) | 0  1  0 |
| d) | 0  0 |

36) What is the output of the following code?

course = "ICS104"

for ch in course:

print(ch, end = " ")

|  |  |
| --- | --- |
|  | ICS104 |
|  | I C S 1 0 4 |
|  | Nothing, there is a syntax error |
|  | Nothing, this is an infinite loop |

37) What is the output of the following code?

for i in range(0, 10, 5):

print(i, end = " ")

|  |  |
| --- | --- |
|  | 0 5 10 |
|  | 0 5 |
|  | 5 10 |
|  | 5 |

38) How many times will the following code print "Python"?

i = 0

while i < 5:

j = 0

while j < i:

print("Python")

j = j + 1

i = i + 1

|  |  |
| --- | --- |
|  | 10 |
|  | 25 |
|  | 36 |
|  | 15 |

39) Which output format string allows 6 positions before and 3 digits after the decimal point?

|  |  |
| --- | --- |
| a) | "%6.3f" |
| b) | "%10.3f" |
| c) | "%9.2f" |
| d) | None of the other answers is correct. |

40) How many times will the following code print "Python"?

for i in range(5):

for j in range(i, 5):

print("Python")

|  |  |
| --- | --- |
| a) | 10 |
| b) | 25 |
| c) | 36 |
| d) | 15 |

41) What is the value of the following Python expression? "ICS 104" \* (4 - 2) \*\* 2

|  |  |
| --- | --- |
| a) | ICS 104ICS 104ICS 104ICS 104 |
| b) | ICS 104 ICS 104 |
| c) | This code will generate an error |
| d) | ICS104ICS104ICS104ICS104 |

42) What is the output of the following code?

n = 1234

r = 0

while n != 0:

r = r \* 10 + n % 10

n = n // 10

print(r)

|  |  |
| --- | --- |
| a) | 4321 |
| b) | 432 |
| c) | 321 |
| d) | 32 |

43) What is the output of the following code?

b = ""

n = 25

while n > 0:

b = str(n % 2) + b

n = n // 2

print(b)

|  |  |
| --- | --- |
| a) | 11001 |
| b) | 10011 |
| c) | 1001 |
| d) | 1100 |

44) For the following mathematical formula, which expression is equivalent in Python?

|  |  |
| --- | --- |
| a) | value = (sqrt(abs(6 \* a\*\*2 + 2 \* b\*\*3)) – 5 \* c ) / (c - 5) + 30 |
| b) | value = sqrt(|6 \* a\*\*2 + 2 \* b\*\*3|) - 5 \* c / c - 5 + 30 |
| c) | value = sqrt(abs(6 \* a\*\*2 + 2 \* b\*\*3)) (- 5 \* c) /(c - 5) + 30 |
| d) | value = sqrt(abs(6 \* a\*\*2 + 2 \* b\*\*3)) - 5 \* c) / c - 5 + 30 |

45) Which one of the while loops is equivalent to the following for loop?

for n in range(10):

print("Python")

|  |  |
| --- | --- |
| a) | while n < 10:  print("Python") |
| b) | while n < 10:  print("Python")  n = n + 1 |
| c) | n = 0 while n < 10:  print("Python")  n = n + 1 |
| d) | n = 0 while n < 10:  print("Python") |

46) What will be the output of the following python code?

num1 = 3

num2 = 9

num3 = 7

if num1 > num2 and num1 > num3:

if num1==3:

print(num2)

print(num1)

elif num2 > num1 and num2 > num3:

if num3 > 6:

print(num1)

print(num2)

elif num3 < num1 and num3 < num2:

print(num3)

|  |  |
| --- | --- |
| a) | 9  3 |
| b) | 3  9 |
| c) | 7 |
| d) | 9  7 |

47) What is the value of the following Python expression?

"Seat" + str(8) + "," + str(6)

|  |  |
| --- | --- |
| a) | Seat8,6 |
| b) | Seat86 |
| c) | This code will generate an error |
| d) | Seat+8+6 |

48) Which of the following **conditions** checks to see if the string variable **message** starts with the string "Please"?

|  |  |
| --- | --- |
| a) | if "Please" in message |
| b) | if "Please" not in message |
| c) | if message.find("Please") |
| d) | if message.startswith("Please") |

49) What output is generated by the following code segment?

a = 20.0

b = 0.44

print("The total is %.2f and the tax is %.2f." % (a, b))

|  |  |
| --- | --- |
| a) | The total is .00 and the tax is .44 |
| b) | The total is 20.00 and the tax is 0.44. |
| c) | The total is 20.0 and the tax is 0.4 |
| d) | The total is 20.0 and the tax is 0.44 |

50) What output is generated by the following code segment?

price = 281.79

title = "Price:"

print("%-7sis%7.2f" % (title, price))

|  |  |
| --- | --- |
| a) | Price:is281.79 |
| b) | Price: is281.79 |
| c) | Price: is 281.79 |
| d) | Price: 281.79 |

**Part 2. [ 25 Points] Code writing**

1. **[10 points] Given the following flowchart**,

**Read a string from the user**

**Number of digits = 0  
Number of letters = 0  
Current character = first character of the string**

**Current character is a digit?**

**Add 1 to the number of digits  
Go to the next character**

**Current character is a letter?**

**Add 1 to the number of letters  
Go to the next character**

**Finished Processing the string?**

**Print the number of digits and letters**

**Yes**

**Yes**

**Yes**

**No**

**No**

**No**

* 1. (2 points) What should the output of the flowchart be when it is given the following 10-character string as input (the apostrophes are not included as part of the string):   
     **'2nd3rd&4th'**

The number of digits = 2 and the number of letters = 4

* 1. (8 points) Develop python code that exactly represent the program depicted in the flowchart. No need to include comments.

string = input("Enter a string: ")

doneProcessing = False

num\_digits = 0

num\_letters = 0

current\_index = 0

while not doneProcessing and current\_index < len(string) :

    letter = string[current\_index]

    if letter.isdigit() :

        num\_digits = num\_digits + 1

    elif letter.isalpha() :

        num\_letters = num\_letters + 1

    else :

        doneProcessing = True

    current\_index = current\_index + 1

print("The number of digits = ", num\_digits, "and the number of letters =",num\_letters)

1. **[15 points] Product or Summation of Even Numbers**

Write Python program that finds either the summation or the product of even integers in the interval [n1, n2] inclusive. The program proceeds as follows:

1. It prompts the user for 2 positive integers n1 and n2.
2. Then, it prompts the user to enter an integer, call it userChoice, which is either 1 for calculating the summation of even numbers or 2 for calculating the product of even numbers.
3. Validate that n1, n2 and userChoice are positive integers, n1<n2 and userChoice is either 1 or 2.
4. If the inputs are valid, the program prints the result with a proper message. Otherwise, it prints a suitable error message and loops to prompt the user for other valid inputs.

No need to include comments.

Sample run 1:

Text

Description automatically generated

Sample run 2:

Text

Description automatically generated

valid = False

while not valid:

s1 = input("Enter the starting integer (n1) of the interval: ")

s2= input("Enter the ending integer (n2) of the interval: ")

c = input("Enter 1 for the summation, or 2 for the product, of even numbers: ")

while not s1.isdigit() or not s2.isdigit() or not c.isdigit():

print("The inputs must be integers\n")

s1 = input("Enter the starting integer (n1) of the interval: ")

s2= input("Enter the ending integer (n2) of the interval: ")

c = input("Enter 1 for the summation, or 2 for the product, of even numbers: ")

n1= int(s1)

n2= int(s2)

choice = int(c)

if n1>=n2:

print("n1 must be smaller than n2\n")

elif choice !=1 and choice !=2:

print("Your choice must be either 1 or 2\n")

else:

valid = True

i = n1

if n1 % 2 ==1:

i=i+1

if choice == 1:

sum = 0

while i <= n2:

sum = sum + i

i = i + 2

print("The summation of even numbers in [%d,%d] is: %d"%(n1,n2,sum))

else:

product=1

while i <= n2:

product = product \* i

i = i + 2

print("The product of even numbers in [%d,%d] is: %d"%(n1,n2,product))