Information and Computer Science Department
ICS 104: Introduction to Programming in Python and C
Midterm Exam, Term 211
Monday, November 1, 2021
Duration: 120 minutes

Name: _____ ID: _____

Instructor and Section: Select one

Instructor	Section
Mr. Mustafa AlTurki	[ ] **01** (UT 9 – 9:50) [ ] **10** (UT 11 – 11:50)
Dr. Husni Al-Muhtaseb	[ ] 0**2** (UT 10 – 10:50) [ ] 0**9** (UT 9 – 9:50)
Dr. Mohammed Amro	[ ] **03** (MW 10 – 10:50) [ ] **04** (MW 11 – 11:50)
Dr. Samer Arafat	[ ] **5** (UT 13 – 13:50) [ ] **6** (UT 14 – 14:50)
Dr. Mohamed Balah	[ ] **7** (MW 8 – 8:50) [ ] **8** (MW 9 – 9:50)

Instructions:

1. Answer all questions. Make sure your answers are **clear** and **readable**.
2. The exam is closed book and closed notes. No calculators or any helping aides are allowed. Make sure to turn off your mobile phone and keep it in your pocket.
3. If there is no space on the front of the page, use the back of the page. Indicate this clearly.

Question	Maximum Points	Earned Points	Remarks
1	**45**		
2	**17**		
3	**10**		
4	**14**		
5	**13**		
6	**15**		
7	**16**		
Total	**100**		

Part 1 : MCQ questions [30 x 1.5 = 45 points]:

Note: Write X for your choice to each question after answering all MCQ questions (GRADING WILL BE BASED ON THE CHOICES IN THIS TABLE ONLY).

		Your choice for each question				
		a	b	c	d	e
	Example			X		
Question number	1			X		
	2				X	
	3		X			
	4			X		
	5			X		
	6		X			
	7				X	
	8	X				
	9		X			
	10				X	
	11					X
	12					X
	13	X				
	14		X			
	15			X		
	16					X
	17		X			
	18		X			
	19			X		
	20	X				
	21				X	
	22	X				X
	23					X
	24				X	
	25					X
	26	X				
	27	X				
	28					X
	29			X		
	30				X	

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

a)	`for`
b)	`5_Year`
c)	`_netPrice`
d)	`price$450`
e)	`3dMax`

2) Which one of the following is **not valid** variable name in Python?

a)	`totalArea`
b)	`_total`
c)	`total_Area`
d)	`areaKm^2`
e)	`CLASS`

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

```
h = "ICS104"
print( H + "2")
```

a)	`ICS1042`
b)	`This code will generate an error`
c)	`ICS104ICS104ICS104`
d)	`None of the answers is correct`
e)	`H2`

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

```
myValue = 85420 // 100 % 100
```

a)	`54.20`
b)	`20`
c)	`54`
d)	`85`
e)	`854`

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

```
myStr = "4" * 3 - 1
print(myStr)
```

a)	`444`
b)	`44`
c)	`This code will generate an error`
d)	`431`
e)	`4*31`

6) Which of the following is the right way to extract the city name and street number from Address that is stored in a string variable called **`myAddress.`** The value of address will always start with city name, space, and street number.

```
myAddress = "MAKKAH 21454"
spaceIndex = myAddress.find(' ')
```

a)	`cityName = myAddress[ 1 : spaceIndex ]` `streetNumber = myAddress[ spaceIndex + 2 : len(myAddress) + 1 ]`
b)	`cityName = myAddress[ 0 : spaceIndex ]` `streetNumber = myAddress[ spaceIndex + 1 : len(myAddress) ]`
c)	`cityName = myAddress[ 0 : spaceIndex ]` `streetNumber = myAddress[ spaceIndex + 2 : len(myAddress) + 1]`
d)	`cityName = myAddress[ 1 : spaceIndex ]` `streetNumber = myAddress[ spaceIndex + 2 : len(myAddress) + 1]`
e)	`cityName = myAddress[ 1 : spaceIndex - 1]` `streetNumber = myAddress[ spaceIndex : len(myAddress) - 1 ]`

7) Which of the following is appropriate to check if the string variable **`str1`** contains only letters or digits?

a)	`str1.isdigit()`
b)	`str1.isalpha()`
c)	`str1. isspace()`
d)	`str1.isalnum()`
e)	`str1. islower()`

8) Which Python statement will print the sample output below (Line 1)?

Sample input:

```
firstName = "Ali"
netSal = 10050.7834
```

Sample Output:

Position	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Line 1	A	l	i							1	0	0	5	0	.	7	8

a)	`print("%-6s %10.2f" %(firstName, netSal))`
b)	`print("%-6s %8.2f" %(firstName, netSal))`
c)	`print("%-6s %-8.2f" %(firstName, netSal))`
d)	`print("%6s %-10.2f" %(firstName, netSal))`
e)	`print("%-6s %-10.2f" %(firstName, netSal))`

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

```
print("ICS 104","sec 5" + "2" )
```

a)	`ICS 104,sec 5+2`
b)	`ICS 104 sec 52`
c)	`This code will generate an error`
d)	`ICS 104 sec ٥ ٢`
e)	`ICS 104 sec 7`

10) Which Python segment will ask the user to input an employee salary, and then stores it as a floating-point number in the variable **`floatNum`**?

a)	`num = float("Enter a salary of employee: ")` `floatNum = num`
b)	`num = input("Enter a salary of employee: ")` `floatNum = int(num)`
c)	`num = input("Enter a salary of employee: ")` `floatNum = num`
d)	`num = input("Enter a salary of employee: ")` `floatNum = float(num)`
e)	`None of the answers is correct`

11) How many times does the following code fragment execute the "**print(n)**" statement? The user enters the numbers **1, 8, 2, 4, 0** in the same order?

```
n = -1
while n!= 0:
    n = int(input("Enter a positive integer"))
    if n % 2 == 0:
        print(n)
```

a)	`3`
b)	`Infinite loop`
c)	`0`
d)	`5`
e)	`4`

12) Assume you have a valid python function named **fun1()** that requires **2** arguments. Which of the following is the right way to call the function and print the returned value?

a)	`netValue = 0`
	`fun1(5,2)`
	`print(netValue)`

b)	`netValue = 0`
	`print(netValue)`
	`fun1(5,2)`

c)	`netValue = 0`
	`netValue = fun1()`
	`print(netValue)`

d)	`netValue = 0`
	`fun1()`
	`print(netValue)`

e)	`netValue = 0`
	`netValue = fun1(5,2)`
	`print(netValue)`

13) What is the order of evaluation of the following python expression?

```
z % ( (x + 3) / 7 ** 2 ) * t / 7 ** 4
```

a)	`+, **, /, **, %, *, /`
b)	`**, /, +, **, %, *, /`
c)	`+, **, /, /, *, %`
d)	`+, **, /, **, %, /, *`
e)	`**, **, /, /, *, %, +`

14) what will be the result of the following python expression?

```
( 9 - 3 > 5 and 3 <= 2 + 1 ) or not (True)
```

a)	`False`
b)	`True`
c)	`not True`
d)	`Error: you can't use arithmetic operators with logical operators`
e)	`None of the answers is correct`

15) Assuming that **num1** is an integer value and greater than 5, what will be the result of the following python expression?

```
7 % (2 + num1) - 6 // (num1 + 1) + 3
```

a)	`3`
b)	`2`
c)	`10`
d)	`5`
e)	`None of the answers is correct`

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

$$result = \frac{\sqrt{|3x^2 + 2y^3|} - 5z}{z + 1} + 3$$

a)	`result = sqrt(|3 * x**2 + 2 * y**3|) - 5 * z / z + 1 + 3`
b)	`result = sqrt(abs(3 * x**2 + 2 * y**3)) (- 5 * z) /(z + 1) + 3`
c)	`result = sqrt(abs(3 * x**2 + 2 * y**3)) - 5 * z) / z + 1 + 3`
d)	`result = (sqrt(|3 * x**2 + 2 * y**3|) - 5 * z ) / (z + 1) + 3`
e)	`result = (sqrt(abs(3 * x**2 + 2 * y**3)) - 5 * z ) / (z + 1) + 3`

17) Which of the following statements is true about errors in Python?

a)	`Run-time errors occur as a result of a mistake in the syntax of the program.`
b)	`The syntax of Python programs that produce Logical errors is always correct.`
c)	`Logical errors are always caught by the Python compiler (interpreter).`
d)	`Syntax errors may not be caught by the python compiler (interpreter).`
e)	`Logical errors are easier to catch and fix than Syntax errors.`

18) What is the value of the Python expression ?

```
"Winkey" * (3 - 1) ** 2
```

a)	`WinkeyWinkey`
b)	`WinkeyWinkeyWinkeyWinkey`
c)	`This code will generate an error`
d)	`Winkey Winkey`
e)	`Winkey2Winkey2`

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

```
n = 10
y = 15
x = 30
if n > 5:
    if y > n:
        if x != 30:
            print("x = 30")
        else:
            print("x not 30")
    else:
        print("y less than n")
else:
    print("n less than 5")
```

a)	`y less than n`
b)	`x = 30`
c)	`x not 30`
d)	`n less than 5`
e)	`No Output`

20) Which of the following statements is true about Python?

a)	`Python is a high-level programming language`
b)	`Python programs must be modified to run on different computer systems.`
c)	`Python is a popular low-level programing language`
d)	`Java, C, and C++ languages have simpler and cleaner syntax than Python`
e)	`Python is not case sensitive.`

21) 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 : Child`
b)	`Age Group : Young Adults`
c)	`Age Group : Middle-aged Adults`
d)	`This code will generate an error`
e)	`Age Group : Old-aged Adults`

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

(here both a) and e) will be considered as correct)

$$s = 2a - \frac{\sqrt{b^3} + 2d}{c} + 4c$$

a)	`s = 2 * a - ((sqrt(b ** 3) + 2 * d) / c )  + 4 * c` missing)
b)	`s = 2 * a - sqrt(b ** 3) + 2 * d / c  + 4 * c`
c)	`s = (2 * a) - (sqrt(b ** 3) + 2 * d) / (c  + 4 * c)`
d)	`s = 2 * (a - (sqrt(b ** 3) + 2 * d) / c  + (4 * c)`
e)	`None of the other answers is correct.`

23) What will be output of the following code segment?

```
s = "Computer Science"
x = s.find("ter")
print(x)
```

a)	`Error`
b)	`-1`
c)	`0`
d)	`6`
e)	`5`

24) Suppose that a Boolean variable **x** is **True** and an integer variable **y** is **0**. Which of the following expressions evaluates to **False**?

a)	`not x or x`
b)	`x and y != 1`
c)	`x or y == -1`
d)	`y == 1 or y == -1`
e)	`y == 0 and x`

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

```
print("in" in "INNINGS")
```

a)	`in`
b)	`True`
c)	`0`
d)	`-1`
e)	`False`

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

```
k = 1
sum = 0
while sum < 6:
    k = k + 1
    sum = sum + k
    print(k, sum)
```

a)	`2 2`
	`3 5`
	`4 9`

b)	`1 2`
	`3 4`
	`4 5`

c)	`2 3`
	`2 5`
	`2 9`

d)	`1 2`
	`3 5`
	`4 9`

e)	`None of the other answers is correct.`

27) How many times does the code fragment given below display "`Inner loop`"?

```
indx1 = 1
while indx1 != 4 :
   indx1 = indx1 + 1
   indx2 = 1
   while indx2 != 4 :
       print("Inner loop")
       indx2 = indx2 + 1
```

a)	9 times
b)	16 times
c)	6 times
d)	8 times
e)	0 times

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

```
value = 4
if value >= 4 :
   value = value - 3
if value > 3 :
   value = value * 4
if value < 10 :
  value = value + 5
print(value)
```

a)	None of the other answers is correct.
b)	16
c)	11
d)	9
e)	6

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

```
name1 = "NameA"
name2 = "NameB"
if name1 <= name2 :
    print(name1[4] + "&" + name2[4])
else :
    print(name2[4] + "&" + name1[4])
```

a)	1&2
b)	B&A
c)	A&B
d)	2&1
e)	None of the other answers is correct

30) Which of the following is a possible output of the following code?

```
from random import randint
for x in range(4):
    print(randint(0,1),end=" ")
```

a)	0 1 2 3
b)	0 2 0 2
c)	0 2 1 3
d)	0 1 0 1
e)	0 1 2 2

Part 2. [25 Points] Show output

1]. What will be the value for each of the following python expressions? (pay attention to the data type).
Assume that variable **m** has a certain value

(6 pts)

Expression	Value
`round(2.27, 1)`	**2.3**
`5-3*4/2+2**(3-1)`	**3.0**
`1 // 2`	**0**
`int("5"+"4")`	**54**
`"ABC">"AD"`	**False**
`m > 5 or m < 10`	**True**

2]. What will be the output of the following python code fragments?

	Output

`# 2 pts`
`for i in range(3,6,2):`
`  count=i`
`  while count<= 6:`
`  print(count,end="")`
`  count=count+1`
`  print()`
	3456
	56

`num = 3  # 1.5 pts`
`if num > 1:`
`  if num < 4:`
`  num = num ** 2`
`  elif num == 9:`
`  num = 0`
`  else:`
`  num = num + 1`
`print(num)`
`if num <= 0:`
`  num = num - 5`
`elif num > 0 and num < 100:`
`  num = num + 4`
`print(num)`
	9
	13

`# 1.5 pts`
`num = int(input("Enter a number: "))`
`if num > 4:`
`  print("A")`
`else:`
`  if num > 2:`
`  print("B")`
`  else:`
`  print("C")`
	User input is: 4
	B

# 2 pts 	
`st='KFUPM'`
`for i in range(len(st)):`
`  st[i].lower()`
`print(st)`
	KFUPM

3 pts
`for b in range(4,8):`
`  if b%5 == 0:`
`  print(b+1)`
`  elif b%2 == 1:`
`  print(b)`
`  else:`
`  print(b-1)`
	3
	6
	5
	7

# 2 pts 	
`def fn1(a):`
`  return a+3`
 	
`def fn2(a):`
`  a=2*a`
`  print(a)`
`  return a`
`x = 5`
`fn2(x)`
`print(fn1(x))`
	10
	8

# 3 pts 	
`i=1`
`sum=0`
`while i<2 or sum<6:`
`  sum=sum+i`
`  i=i+1`
`print(sum,i)`
	6 4

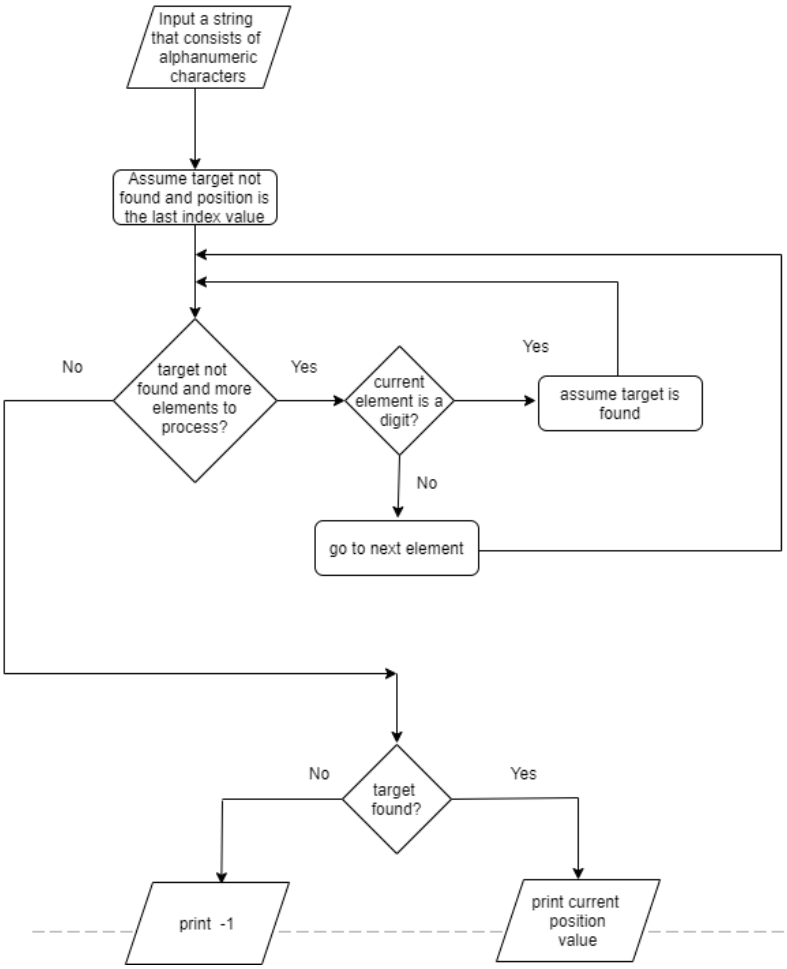
`x = 2` # 2 pts
`y = 3`
`z = 6`
 	
`if z >= x:`
`  print("first")`
`elif z >= y:`
`  print("second")`
`if x == 2:`
`  print("third")`
	first
	third

`phrase = "211-ICS104-Midterm"` # 2 pts
`a = int(phrase[8])`
`b = phrase.find('0')`
`print(a,b)`
	0 8

Part 3. [30 Points] Code writing

Part 3. [30 Points] Code writing

1] Given the following flowchart, write the equivalent python code. (10 points)




```
String=input("Enter alphanumeric string : ")
found = False
position = len(string) - 1
while not found and position >= 0:
    if string[position].isdigit():
        found = True
    else:
        position = position -1
if found:
    print("current position = ",position)
else:
    print(-1)
```

2] **20 points**

Write a Python program that will find the letter grades and average **gpa** for a class of unknown number of students based on scores entered by the user.
The user input will consist of numerical values only. Once the user finishes entering the scores, he will press the "Enter" key without entering any value and this to terminate the program.
If the entered score is less than 0 or greater than 100, your program will print an error message as in the sample run shown below (and should continue to allow the user to enter values). If the user presses the "Enter" key from the beginning without entering any value, your program will display the error message "You did not enter any valid score" (sample run 2).
The letter grades of all students should be collected in one string and displayed at the end with the number of students and the **average gpa** of the class.
Letter grades are A, B, C, D, or F, only. The table below shows the letter grades and the corresponding gpa based on the score range.
Note: show clearly the indentation in your program.

Score range	grade	gpa
90 <= score	A	4
80 <= score < 90	B	3
70 <= score < 80	C	2
60 <= score < 70	D	1
score < 60	F	0

Sample run 2

```
Enter an integer score:
you did not enter any valid score
```

Sample run 1

```
Enter an integer score: 95
Enter an integer score: 82
Enter an integer score: 105
Input is out of the valid range.
Enter an integer score: 77
Enter an integer score: -20
Input is out of the valid range.
Enter an integer score: 66
Enter an integer score:
Total number of students is:  4
Their letter grades are: ABCD
the average gpa = 2.5
```

```
count = 0
totalGpa=0
letterGrade=""
value = input("Enter an integer score: ")
while value != "" :
        value = int(value)
        if value >=0 and value<=100 :
            if value >= 90 :
                curGrade = "A"
                gpa = 4
            elif value >= 80  :
                curGrade = "B"
                gpa=3
            elif value >= 70  :
                curGrade = "C"
                gpa=2
            elif value >= 60 :
                curGrade = "D"
                gpa=1
            else :
                curGrade = "F"
                gpa=0
            count = count + 1
            totalGpa=totalGpa+gpa
             letterGrade= letterGrade+curGrade
        else :
            print("Input is out of the valid range. ")
        value = input("Enter an integer score: ")
if count > 0:
    average=totalGpa/count
    print("Total number of students is: " , count)
    print("Their letter grades are: "+letterGrade)
    print("the average gpa =",average)
else:
    print("you did not enter any valid score")
```