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MAIN EXAMINATION

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MAY – AUGUST 2021

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DEPARTMENT OF COMPUTER AND INFORMATION SCIENCE

REGULAR PROGRAMME

CMT 210: OBJECT ORIENTED PROGRAMMING I

Date: AUGUST 2021

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and any TWO Questions

QUESTION ONE

a) Select appropriate answer from choices given below

i) TRUE/FALSE: A brute-force algorithm will try all possible solutions until it finds one that works. **[1 Mark]**

ii) TRUE/FALSE: The print statement is a debugging aid. **[1 Mark]**

iii) TRUE/FALSE: Black-box testing requires examining a program's code. **[1 Mark]**

iv) TRUE/FALSE: All program designs can be expressed using the I-P-O model.

[1 Mark]

v) What does this code print when run? **[1 Mark]**

```
x = 0
```

```
for i in range(3):
```

```
    x = x + M[i][i]
```

```
print x
```

a) 0

b) 15

c) 19

d) 45

vi) Select the correct option to draw a rectangle centred at 50,50 with width and height as 50, 70 respectively. **[1 Mark]**

A - Canvas.create_rect(50,50,50,70)

B - Canvas.create_rect(50,70,50,50)

C - Canvas.create_rectangle(50,50,50,70)

D - Tkinter.create_rect(50,50,50,70)

vii) Analyze the code –

[1 Mark]

```
print("Recursive Function")
def factorial(n):
    return(n*factorial(n-1))
factorial(4)
```

A - Recursive Function 24.

B - Recursive Function.

C - Function runs infinitely and causes a StackOverflowError.

D - Syntax Error.

viii) For tuples and list which is correct?

[1 Mark]

A - List and tuples both are mutable.

B - List is mutable whereas tuples are immutable.

C - List and tuples both are immutable.

D - List is immutable whereas tuples are mutable.

ix) Which method is used to convert raw byte data to a string?

A - Encode()

B - Decode()

C - Convert()

D - tostring()

x) What is output for –

[1 Mark]

$2 * 2 ** 3$

A - 12

B - 64

C - 16

D - 36

E- 54

b) Name **TWO** or more variations on Python's standard execution model. **[2 Marks]**

c) What does "immutable" mean, and which three of Python's core types are considered immutable? **[4 Marks]**

d) What is the value of the expression $2 + 3 * 4$ in Python? **[3 Marks]**

e) Consider the following three statements. Do they change the value printed for A? **[4 Marks]**

```
A = "spam"
```

```
B = A
```

```
B = "shrubbery"
```

a) Given a string S with the value "s,pa,m", name two ways to extract the two characters in the middle. **[4 Marks]**

Answer: You can slice the string using `S[2:4]`, or split on the comma and index the string using `S.split(',')[1]`. Try these interactively to see for yourself.

b) Using suitable examples, describe **FOUR** operations that change a list object in place. **[8 Marks]**

c) What about this code—what's the output, and why?

```
>>> X = 'Spam'
```

```
>>> def func(): X = 'NI' def nested(): print(X) nested()
```

```
>>> func() >>> X
```

h) Suppose you are given a list of words, `wordList`. Write Python code that will write one line for each word, repeating that word twice. For example if `wordList` is `['Jose', 'Sue', 'Ivan']`, then your code would print `Jose Jose Sue Sue Ivan Ivan` **[5 Marks]**

QUESTION TWO

a) How can you determine how large a tuple is? Why is this tool located where it is?

[5 Marks]

b) Write a python expression that changes the first item in a tuple. (4, 5, 6) should become (1, 5, 6) in the process.

[4 Marks]

c) Write a Python program that uses an if statement to find the smallest of three given integers. (The user should enter the three numbers).

[5 Marks]

```
num1 = input("Enter num1: ")
```

```
num2 = input("Enter num2: ")
```

```
num3 = input("Enter num3: ")
```

```
if num1 < num2 and num1 < num3:
```

```
min = num1 elif num2 < num1 and num2 < num3:
```

```
min = num2
```

```
else: min = num3 print("Smallest is", min)
```

c) Write short notes on the following:

[6 Marks]

- i) Tuples
- ii) Dictionary
- iii) List

QUESTION THREE

a) Identify **THREE** things are required in a C-like language but omitted in Python?

[3 Marks]

b) What is the output of the following code, and why?

[4 Marks]

```
>>> X = 'Spam'  
>>> def func(): print(X)  
>>> func()
```

c) Describe **THREE** or more ways to retain state information in a Python function

[6 Marks]

d) Assuming a function process is already defined, write two lines of code, using a for loop, that is equivalent to the following:

[2 Marks]

```
process('Joe')
```

```
process('Sue')
```

```
process('Ann')
```

```
process('Yan')
```

d) Write a Python program that uses an if statement to find the smallest of three given integers.

```
(The user should enter the three numbers). num1 = input("Enter num1: ") num2 =  
input("Enter num2: ") num3 = input("Enter num3: ") if num1 < num2 and num1 <  
num3: min = num1 elif num2 < num1 and num2 < num3: min = num2 else: min =  
num3 print("Smallest is", min)
```

e) Outline **FIVE** reasons why python is robust and most preferred language. **[5 Marks]**

QUESTION FOUR

a) Using suitable example, identify **FOUR** the most common coding mistake among Python beginners. **[4 Marks]**

b) Write a function that take two numbers, x and y, and returns the sum of numbers from x to y. **[5 Marks]**

c) Describe **THREE** things are required in a C-like language but omitted in Python. **[6 Marks]**

d) Write code to create a Python dictionary (the dict type). Add two entries to the dictionary: Associate the key 'name' with the value 'Juan', and associate the key 'phone' with '508-1234' **[5 Marks]**

QUESTION FIVE

a) Write a program that displays the result of $9.5 * 4.5 - 2.5 * 3$ and $45.5 - 3.5$ **[5 Marks]**

b) Complete the code for the following function so it matches its documentation:

[3 Marks]

```
def doubleList(numberList):
```

```
    """ For each of the numbers in the list numberList, print a line containing twice the  
    original number. For example, doubleList([3, 1, 5]) would print 6 2 10 """
```

c) Differentiate between enclosing a list comprehension in square brackets and parentheses. **[2 Marks]**

d) What's wrong with checking the types of objects passed into a function? Explain **[3 Marks]**

Checking the types of objects passed into a function effectively breaks the function's flexibility, constraining the function to work on specific types only. Without such checks, the function would likely be able to process an entire range of object types—any objects that support the interface expected by the function will work. (The term interface means the set of methods and expression operators the function's code runs.)

e) Write a function that take two numbers, x and y, and returns the sum of numbers from x to y. **[4 Marks]**

f) Will the following program terminate? Justify your answer **[3 Marks]**

```
balance = 10
```

```
while True:
```

```
    if balance < 9: continue
    balance = balance - 9
```