



38

*(Knowledge for Development)*

**KIBABII UNIVERSITY**

**(KIBU)**

**UNIVERSITY EXAMINATIONS  
2020/2021 ACADEMIC YEAR**

**SPECIAL/SUPPLEMENTARY EXAMINATIONS  
YEAR THREE SEMESTER ONE EXAMINATIONS**

**FOR THE DEGREE OF  
BACHELOR OF SCIENCE  
(COMPUTER SCIENCE)**

**COURSE CODE : CSC 361E**

**COURSE TITLE : GENERIC**

**PROGRAMMING USING PYTHON**

**DATE: 10/01/2022**

**TIME: 11.00 A.M – 01.00 P.M**

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**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO**

## QUESTION ONE (COMPULSORY) [30 MARKS]

a) Assume that we execute the following assignment statements:

```
width = 17
height = 12.0
```

For each of the following expressions, write the value of the expression.

[3 marks]

- i. width//2
- ii. width/2.0
- iii. height/3

b) Look at the following statement:

```
mystring = 'cookies>milk>fudge>cake>ice cream'
```

Write a statement that splits this string, creating the following list:

```
['cookies', 'milk', 'fudge', 'cake', 'ice cream']
```

[4 marks]

c) Assume the variable `dict` references a dictionary. Write an `if` statement that determines whether the key 'James' exists in the dictionary. If so, display the value that is associated with that key. If the key is not in the dictionary, display a message indicating so. [4 marks]

d) Write a while loop that asks the user to enter two numbers. The numbers should be added and the sum displayed. The loop should ask the user if he or she wishes to perform the operation again. If so, the loop should repeat, otherwise it should terminate. [4 marks]

e) What is the difference between a list and a tuple? Show how you create a list from a tuple and how you create a tuple from a list. [3 marks]

f) Write a function that computes the sum of the digits in an integer. Use the following function header:

```
def sumDigits(n): For example, sumDigits(234) returns 9 (2+3+4) [4 marks]
```

g) Given a list saved in a variable: `a = [1, 4, 9, 16, 25, 36, 49, 64, 81, 100]`. Using list comprehension, write one line of Python that takes this list `a` and makes a new list that has only the even elements of this list in it. [3 marks]

h) Write a loop that counts the number of space characters that appear in the string referenced by `mystring`. [2 marks]

i) Write a function that accepts a string as an argument and returns true if the argument ends with the substring `'.com'`. Otherwise, the function should return false. [3 marks]

## QUESTION TWO [20 MARKS]

Consider the following lines from the text Romeo and Juliet with punctuations removed. Assume the lines are stored in a text file named `Juliet.txt`

```
But soft what light through yonder window breaks
It is the east and Juliet is the sun
Arise fair sun and kill the envious moon
Who is already sick and pale with grief
```

- Write Python code to prompt for the file name and open it for reading. Account for the case where the file does not exist. [4 marks]
- Write a program to count how many times each word appears in the file [6 marks]
- Write a program to count how many times each character appears in the file. [4 marks]
- Write a program to write to a file all characters which occur more than 5 times in the text file above [6 marks]

## QUESTION THREE [20 MARKS]

- Define a function that examines three variables- `x`, `y`, and `z`- and prints the largest odd number among them. If none of them are odd, it should print a message to that effect. [7 marks]
- Write a function named `times_ten`. The function should accept an argument and display the product of its argument multiplied times 10 [5 marks]
- What will the following program display? [5 marks]

```
def main():
    x = 1
    y = 3.4
    print(x, y)
    change_us(x, y)
    print(x, y)
```

```
def change_us(a, b):
    a = 0
    b = 0
    print(a, b)
```

```
main()
```

- What will be the output of the following Python code? [3 marks]

```
1. x = 50
2. def func(x):
3.     print('x is', x)
4.     x = 2
5.     print('Changed local x to', x)
6. func(x)
7. print('x is now', x)
```

## QUESTION FOUR [20 MARKS]

- a) When the `__init__` method executes, what does the `self` parameter reference? [1 mark]
- b) Write a class definition named `Book`. The `Book` class should have data attributes for a book's title, the author's name, and the publisher's name. The class should also have the following:
- An `__init__` method for the class. The method should accept an argument for each of the data attributes. [3 marks]
  - Accessor and mutator methods for each data attribute. [3 marks]
  - An `__str__` method that returns a string indicating the state of the object. [3 marks]
- c)
- Write a class named `RetailItem` that holds data about an item in a retail store. The class should store the following data in attributes: item description, units in inventory, and price. [7 marks]
  - Once you have written the class, write a program that creates three `RetailItem` objects and stores the following data in them: [3 marks]

	Description	Units in Inventory	Price
Item #1	Jacket	12	59.95
Item #2	Designer Jeans	40	34.95
Item #3	Shirt	20	24.95

## QUESTION FIVE [20 MARKS]

- a) Develop a program to help a class one pupil practice addition. The program randomly generates two single-digit integers, **number1** and **number2**, and displays to the student a question such as **What is 1 + 7**. The program evaluates the response and gives the feedback in the format. "Great! You got it right! Try the next question." or "That is incorrect, try the next question". After five questions print the overall result as "You scored 4/5". [10 marks]
- b) Write a program that reads an unspecified number of integers, determines how many positive and negative values have been read, and computes the total and average of the input values (not counting zeros). Your program ends with the input **0**. Display the average as a floating-point number. [10 marks]

### Sample output:

```
Enter an integer, the input ends if it is 0: 3
Enter an integer, the input ends if it is 0: -1
Enter an integer, the input ends if it is 0: 2
Enter an integer, the input ends if it is 0: 1
Enter an integer, the input ends if it is 0: 0
```

```
The number of positives is 3
The number of negatives is 1
The total is 5
The average is 1.25
```