(Knowledge for Development)

KIBABII UNIVERSITY

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UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS

YEAR THREE SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF

(COMPUTER SCIENCE)

COURSE CODE : CSC 361E

COURSE TITLE : GENERIC PROGRAMMING USING PYTHON

DATE: 18/05/2022 TIME: 02.00 P.M – 04.00 P.M

INSTRUCTIONS TO CANDIDATES

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) Define a function called computegrade that takes a score as its parameter and returns a grade as a string.   **[5 marks]**

```
Score              Grade
>= 0.9               A
>= 0.8               B
>= 0.7               C
>= 0.6               D
< 0.6                F
```

Sample output:
```
Enter score: 0.95
A
Enter score: perfect
Bad score
```

c) 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]**

d) Write code segment to sak the user for a string and print out whether this string is a palindrome or not. (A **palindrome** is a string that reads the same forwards and backwards.)   **[3 marks]**

e) Between a list and a tuple, which one can be used as a key value in a dictionary and why?

[2 marks]

f) Assume names references a list. Write a for loop that displays each element of the list.

g) Given **the** dictionary **below,** get anll values from the dictionary and add **create** a list **of these values** but don't add duplicates.

```
speed ={'jan':47, 'feb':52, 'march':47, 'April':44, 'May':52, 'June':53,
'july':54, 'Aug':44, 'Sept':54}
```
[3 marks]

h) Write a program which will find all such numbers which are divisible by 7 but are not a multiple of 5, between 2000 and 3200 (both included). The numbers obtained should be printed in a comma-separated sequence on a single line. **[3 marks]**

i) Assuming that we have some email addresses in the "username@companyname.com" format,

   i.   write a program segment to print the user name of a given email address. Both user names and company names are composed of letters only. **[2 marks]**

   ii.   write a program segment to print the company name of a given email address. **[2 marks]**

j) Write a Python function to multiply all the numbers in a list. **[2 marks]**

k) Rewrite the following for loop using a while loop. **[2 marks]**
```
sum = 0
for i in range(100):
    sum += i
```

QUESTION TWO [20 MARKS]

a) In a supermarket, all vegetables have a product code, name, some description, and price per unit. Design a class called `Vegetable` to represent the vegetables. Provide `get` and `set` methods for the class. **[10 marks]**

b) Design a class called `Sentence` that has a constructor that takes a string representing the sentence as input. The class should have the following methods:

   _ `get first word`
   _ `get all words`
   _ `replace(index, new word)` —Change a word at a particular index to "new word." E.g. If the sentence is "I'm going back." and set word at index (2, "home"), then the sentence becomes " I'm going home." **[10 marks]**

QUESTION THREE [20 MARKS]

a) Write a class named Employee that holds the following data about an employee in attributes: `name`, `ID number`, `department`, `and job title`. **[6 marks]**

b) Create a program that stores Employee objects in a dictionary. Use the employee ID number as the key. The program should present a menu that lets the user perform the following actions: **[10 marks]**

- Look up an employee in the dictionary
- Add a new employee to the dictionary
- Change an existing employee's name, department, and job title in the dictionary
- Delete an employee from the dictionary
- Quit the program

c) When the program ends, it should pickle the dictionary and save it to a file. Each time the program starts, it should try to load the pickled dictionary from the file. If the file does not exist, the program should start with an empty dictionary.   **[4 marks]**

QUESTION FOUR [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
```

a) 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]**

b) Write a program to count how many times each word appears in the file   **[6 marks]**

c) Write a program to count how many times each character appears in the file.   **[4 marks]**

d) Write a program to write to a file all characters which occur more than 5 times in the text file above   **[6 marks]**

QUESTION FIVE [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:

i. An `__init__` method for the class. The method should accept an argument for each of the data attributes.   **[3 marks]**

ii. Accessor and mutator methods for each data attribute.   **[3 marks]**

iii. An `__str__` method that returns a string indicating the state of the object.   **[3 marks]**

c)

i.   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]

ii. 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