AFRICA UNIVERSITY

(A United Methodist-Related Institution)

COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION SYSTEMS

COURSE TITLE: INTERMEDIATE PROGRAMMING

COURSE CODE: CSC310

SUPPLIMENTARY EXAMINATION

SESSION: JANUARY 2020

LECTURER: MUKHALELA B.U

TIME: 3 HOURS

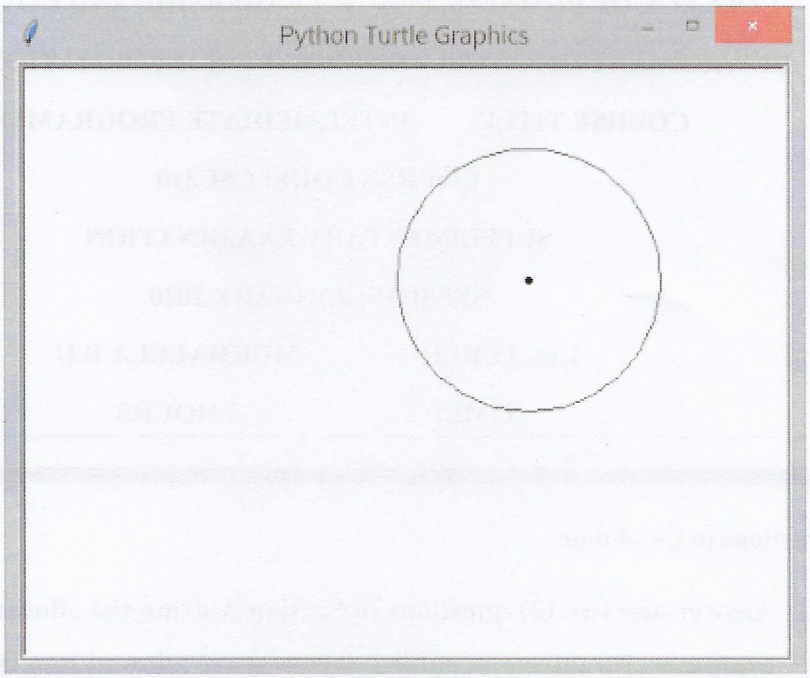
Instructions to Candidate

1. **Answer any two (2) questions in Section A using the allocated computer. No internet enabled device(s) are allowed into the exam room.**
2. **Answer any three (3) questions in Section B.**
3. **Each question carries 20 marks.**
4. **All codes are to be in either Python or Java as asked on each question. No mixture of languages is allowed on a single question attempted for Section A.**

Section A **[40 marks]**

Question 1 **[20 marks]**

a. Imagine you are employed as a Junior Python Developer by a gaming software development company and you are part of a team asked to produce a Darts game. Your specific task is to produce only the outer canvas (circle) of the game's GUI. Using python code, reproduce the canvas shown below.



NB: Save your code in a folder you are to callCSC310 + Student number on the desktop, file name should be darts_circle_canivas.py. (12)

b. Imagine your next project after one in (a) above was to write a story_generator script to be included in a Kids-story-tell program, write a python program that generates a story: **Hint:** make use of: **lists, random, if, and elif** components. **NB**; creativity shall earn you more marks. Save the project in the same folder that you created on the desktop, file name should be: stroytell.py. (8)

Question 2 (use either Python or Java to attempt this question) **[20 marks]**

As you just joined BankACD, you were given a task to write a program that will produce results close to that shown below. You are told that, the bank accounts must store a large amount of information: the account owner's name, address, social security number, account number, etc. To streamline your code, only model bank accounts that maintain just three attributes:

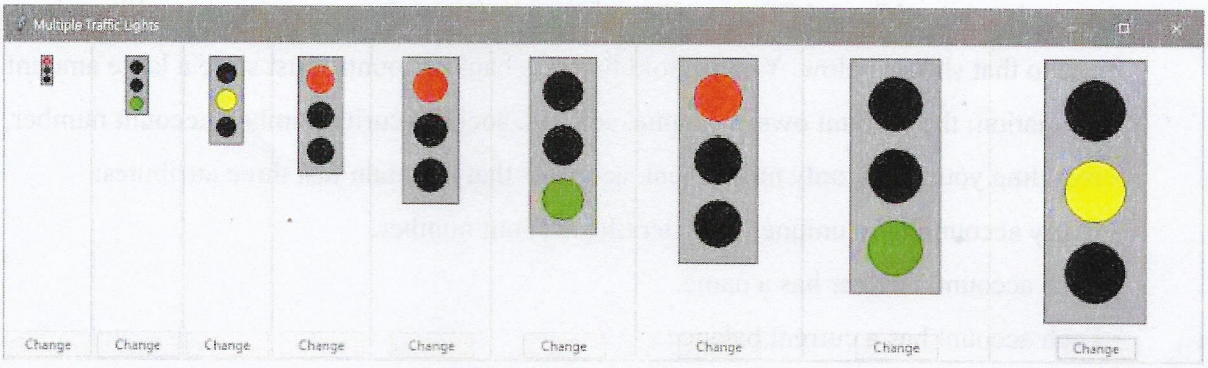
- Every account has a unique identifier, the account number.
- Each account's owner has a name.
- Each account has a current balance.

Each account object would have an account number instance variable (integer), a name instance variable (string), and a balance instance variable (integer number of cents—we will use integers to avoid floating-point imprecision). The bank account management application could store the accounts in a list and move the contents of the list to a file for persistent storage.

```
[  324 Fred         34523 ]
[  371 Ella       1263210 ]
[  129 Zoe         78934 ]
[  120 Owen       247702 ]
[  412 Lily       12000 ]
[  420 Bert       10354 ]
[ 1038 George      6733498 ]
[  966 Jan        9923912 ]
[ 1210 Judy          83497 ]
[ 1300 Sam         50315 ]
--------------------
Account 129 before deposit of $100: [  129 Zoe        78934 ]
Account 129 after  deposit of $100: [  129 Zoe        79034 ]
--------------------
Account 129 before withdraw of $500: [  129 Zoe        79034 ]
Account 129 after  withdraw of $500: [  129 Zoe        78534 ]
--------------------
Account 129 before withdraw of $80000: [  129 Zoe         78534 ]
Account 129 after  withdraw of $80000: [  129 Zoe         78534 ]
```

Question 3 **[20 marks]**

a. Having just joined ZINARA's System development unit, you have been asked to code a program that control a city's traffic light's control center as shown below.



(12)

b. Write a program that will reproduce the following shape produced by asterisks to be included as part of a zoo program to mimic allocated paddocks for animals in a zoo. The zoom attendant should be able to recommend his or her own dimension for a rectangular paddock that he she sees fit for the number of animals he or she wants stored in the virtual rectangular paddock. (8)

Question 4 **[20 marks]**

Write a program that incorporates a **while** statement so that the program's execution continues until the problem is resolved or its resolution is beyond the capabilities of the program. The desired computer troubleshooting program forces the user to rerun the program once a potential program has been detected (for example, turn on the power switch, then run the program again to see what else might be wrong). (20)

Section B **[60 marks]**

Question 5 **[20 marks]**

a. Define the following terms as used in OOP, cite examples:

(i) Class

(ii) Object

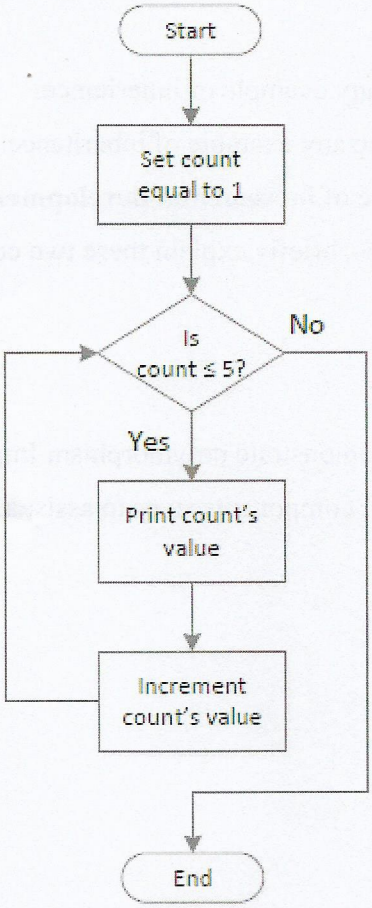
(iii) Method

(iv) Message

(v) State (5)

b. Using a banking object-oriented analysis (OOA), demonstrate how the above terms can be mimicked on a banking system. (5)

c. Given the model below :



Write python or java code implementation for the while flow chart shown above. (4)

d. You were told that a Rabbit farmer wants all the Does (female rabbits to stay in even numbered Hatches or cages while the all Bucks (male rabbits are to occupy all odd numbered Hatches or cages. Write either java or python code snippet to model such scenarios using a **for loop**. (6)

Question 6 **[20 marks]**

a. Given below code snippet, determine what will the code below print when run?

x = 0

```
for i in range(3):
        for j in range(3):
            x = x + M[i][j]
print x
```
(3)

b. Write java code snippet for implementing any example of inheritance. (7)

c. Write python code snippet for implementing any example of inheritance. (7)

d. A senior developer advised you to make use of **incremental development** and **scaffolding** when developing slightly complex programs, briefly explain these two concepts. (3)

Question 7 **[20 marks]**

a. Using either java or python code snippet, demonstrate polymorphism Implementation.(10)

b. Write brief notes on the following java GUI components so as to assist a novice programmer who has just joined your organization:

(i) JButton

(ii) JCheckBox

(iii) JComboBox. (10)

Question 8 **[20 marks]**

On each below, use examples;

(i) Compare and contrast use of indentation versus blocks {} in python and java.(5)

(ii) Comment on portability of both Java and python. (5)

(iii) Using code snippet in java, exception-handling. (5)

(iv) Differentiate between runtime-error versus syntactic error. (5)

End of Examination.