AFRICA UNIVERSITY
A United Methodist-Related Institution

"Investing in Africa's Future"

COLLEGE OF ENGINEERING AND APPLIED SCIENCES (CEAS)

NCIS 215: OBJECT ORIENTED PROGRAMMING

END OF SECOND SEMESTER EXAMINATIONS

APRIL/MAY 2025

LECTURER: MS ELIZABETH MAFU

TIME: 3 HOURS

INSTRUCTIONS

Use the IDE you are familiar with to answer the questions

Copy the code and take a screenshot of the output to a word document

Save the scripts and converted word to pdf document in one folder

Save in the storage device provided

Answer five (5) questions

Question 1

Copy, Run and Debug the following code. Use comments to explain the code, comment out any errors, and suggest how they can be corrected. **[20]**

```
class Person
{
    public int Id { get; set; }
    public string FirstName { get; set; }
    public string LastName { get; set; }

class Employee : Person
{
    public string CompanyName { get; set; }
    public decimal Salary { get; set; }

    public void Display Infor()
{
Console.WriteLine($"he works at {CompanyName} and earning $
{Salary}")
}

}
public class Program
{
     public static void Main()
     {
Person per1 = new Person();
        per1.Id = 1;
        per1.FirstName = "James";
        per1.LastName = "Bond";
        per1.CompanyName;
        per1.Salary;

        Person per2 = new Employee();
        per2.Id = 2;
        per2.FirstName = "Bill";
        per2.LastName = "Gates";
        per2.CompanyName;
        per2.Salary;

        Employee emp = new Employee();
        emp.Id = 1;
        emp.FirstName = "Steve";
        emp.LastName = "Jobs";
        emp.CompanyName = "XYZ";
        emp.Salary = 10000;
        Employee emp = new Person();
     }
}
```

Question 2

Create a base class Shape with a method GetArea. Then, create two derived classes Circle and Rectangle that override the GetArea method to calculate the area of the respective shapes. **[20]**

Question 3

Create a C# program that implements an abstract class Animal that has a Name property of type text and three methods SetName (string name), GetName and Eat. The Eat method will be an abstract method of type void.

You will also need to create a Dog class that implements the above Animal class and the Eat method that says the dog is Eating.

To test the program ask the user for a dog name and create a new Dog type object from the Main of the program, give the Dog object a name, and then execute the GetName and Eat methods. **[20]**

Question 4

a. Create a class named **Person** with the following properties:
   Name (string)
   Age(int)

   Include a method **Introduce** that prints a message introducing the person. **[6]**

b. Create a base class Animal with a method MakeSound. Then, create a derived class Dog that overrides the MakeSound method to print "Woof!". **[14]**

Question 5

Create a C# program that implements an IVehiculo interface with two methods, one for Drive of type void and another for Refuel of type bool that has a parameter of type integer with the amount of gasoline to refuel. Then create a Car class with a builder that receives a parameter with the car's starting gasoline amount and implements the Drive and Refuel methods of the car.

The Drive method will print on the screen that the car is Driving, if the gasoline is greater than 0. The Refuel method will increase the gasoline of the car and return true.

To carry out the tests, create an object of type Car with 0 of gasoline in the Main of the program and ask the user for an amount of gasoline to refuel, finally execute the Drive method of the car. **[20]**

Question 6

Create a C# program to manage a photo book using object-oriented programming.

To start, create a class called **PhotoBook** with a private attribute **numPages** of type **int**. It must also have a public method **GetNumPages** that will return the number of photo book pages.

The default constructor will create an album with 16 pages. There will be an additional constructor, with which we can specify the number of pages we want in the album.

There is also a **BigPhotoBook** class whose constructor will create an album with 80 pages.

Finally create a **PhotoBookTest** class to perform the following actions:

- Create a default photo book and show the number of pages
- Create a photo book with 20 pages and show the number of pages
- Create a large photo book and show the number of pages **[20]**

END OF EXAMINATION