	COLLEGE OF COMPUTING AND INFORMATION SCIENCES		
	Final-Term Assessment Spring 2021 Semester		
Class Id	106325/106204/106205/106207/ 106203/106206	**Course Title**	OOP
Program	BSCS	**Campus / Shift**	Main Campus /Morning
Date	4th – May 2021	**Total Marks**	40
Duration	2 hours and 15 minutes	**Faculty Name**	M.Zubair / Syed Umair Ali/ Umm e Kulsoom/ Arabi Tayyab
Student Id	12113	**Student Name**	Shahmeer khan (106204).

Instructions:

- Fill out your Student ID and Student Name in above header.
- Do not remove or change any part of question paper.
- Write down your answers with title "Answer for Question# 00".
- Handwritten text or image should be on A4 size page with clear visibility of contents.
- In case of CHEATING, COPIED material or any unfair means would result in negative marking or ZERO.
- Only PDF format will be accepted. Rename your files as **"YourName-YourRollNo.pdf"**.Other formats and named files will not be accepted.
- **Caution:**Duration to perform Final-Term Assessment is **02 hours and 15 minutes only**. Extra 45 minutes are given to cater all kinds of odds in submission of Answer-sheet. **Therefore, if you failed to upload answer sheet on LMS (in PDF format) within 3 hours limit, you would be considered as ABSENT/FAILED.**

Note : Only handwritten answer scripts will be accepted. You cannot attach screenshots of typed code.

Attempt any and only 4 questions

QUESTION#1 - [10 points]

Design a **Book** class that holds the title, author's name, and price of the book. Books's constructor should initialize all of these data members except the price which is set to 500/-. Create a display method that displays all fields.

All Books are priced at 500/- unless they are PopularBooks. The **PopularBooks** subclass replaces the Bookprice and sets each Book's price to 50,000/- through PopularBooks construcor. Override the display method to display all fields.

Write a Main () method that declares an **array** of five **Book** objects. Ask the user to enter the title and author for each of the 5 Books. Consider the Book to be a PopularBook if the author is one of the following: Khaled Hosseini, Oscar Wilde, or Rembrandt. Display the five Books' details.

OOP Theory (Final Exam)

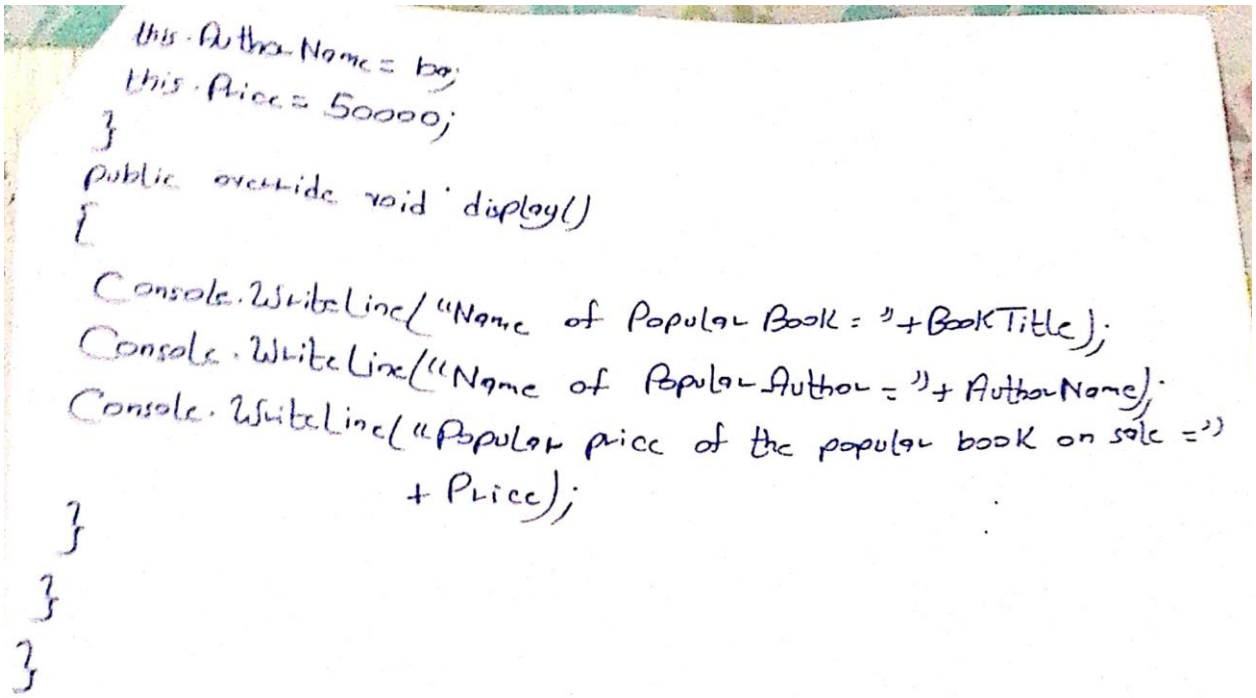
Name Shahnawaz Khan
Class ID 106204
Std ID 12115

Question no 1;

Code;

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Threading.Tasks;
namespace Paper
{
  class Program
  {
    static void Main(string[] args)
    {
      string [] BN = new string [5];
      string [] AN = new string [5];
      for(int i=1; i<=BN.Length; i++)
      {
        Console.WriteLine("Enter Book Title: ");
        BN[i] = Console.ReadLine();
        for(int j=1; j<=AN.Length; j++)
        {
          Console.WriteLine("Enter Author Name: ");
          AN[j] = Console.ReadLine();
          if(AN[j] == "Khaled Hussaini" || AN[j] == "Oscar Wilde"
            || AN[j] == "Rembrandt")
          {
            PopularBooks ppb = new PopularBooks(BN[i], AN[j]);
            ppb.display();
          }
```

```
            else
            {
                Book bk = new Book(BN[i], AN[j]);
                bk.display();
            }
            break;
        }
    }
    Console.ReadKey();
  }
}
class Book
{
  public string BookTitle;
  public string AuthorName;
  public double Price = 500.00;
  public Book(string t, string a)
  {
      this.BookTitle = t;
      this.AuthorName = a;
  }
  public virtual void display()
  {
    Console.WriteLine("Name of the book = " + BookTitle);
    Console.WriteLine("Name of the Author = " + AuthorName);
    Console.WriteLine("Ridiculously cheap price of the book on sale = " + Price);
  }
}
class PopularBooks : Book
{
  public PopularBooks(string bt, string ba) : base("Treasure island", "RLS")
  {
    this.BookTitle = bt;
```



```
        this.AuthorName = by;
        this.Price = 50000;
    }
    public override void display()
    {
        Console.WriteLine("Name of Popular Book = "+BookTitle);
        Console.WriteLine("Name of Popular Author = "+AuthorName);
        Console.WriteLine("Popular price of the popular book on sale ="
                          + Price);
    }
}
}
```

QUESTION#2 - [10 points]

Write the definition for the **Triangle** class that works for the following main() method.

```
public static void Main(string[] args)
{
        Triangle tri1 = new Triangle(1.0,2.0);
        Triangle tri2 = new Triangle(1.0,2.0);
        Triangle tri3 = tri1 - tri2;
        tri3.DisplayDetails();
        if(tri1 == tri2)
```

```
        {
        Console.WriteLine("The area is: " +tri3.CalculateArea());
        }
        else
        {
        Console.WriteLine("Area cannot be calculated.");
        }

}
```

OOP Theory (Final-Exam)

Name: Shahnaaz Khan
Class ID: 106204
Std. ID: 12113

Question no. 2;

Code:

```
Using System;
Using System.Collection.Generic;
Using System.Linq;
Using System.Threading.Task;
Namespace Paper
{
  class Program
  {
    static void Main(string[] args)
    {
      Triangle tri1 = new Triangle(1.0, 2.0);
      Triangle tri2 = new Triangle(1.0, 2.0);
      Triangle tri3 = tri1 - tri2;
      tri3.DisplayDetails();
      if (tri1 == tri2)
      {
        Console.WriteLine("The area is : " + tri3.CalculateArea());
      }
      else{Console.WriteLine("Area couldn't be calculated");}
      Console.ReadKey();
    }
  }
  class Triangle
  {
    public double Base, Height;
    public double area;
```

```
Public Triangle(double Base, double Height)
{
  this.Base = Base;
  this.Height = Height;
}
Public double calculateArea()
{
 area = this.Height * this.Base/2;
 return area;
}
Public Triangle(){}
Public static Triangle operator -(Triangle tri1, Triangle tri2)
{
  Triangle tria = new Triangle();
  tria.Base = tri1.Base + tri2.Base;
  tria.Height = tri1.Height + tri2.Height;
  return triangle;
}
public void DisplayDetails()
{
  Console.WriteLine("Height: " + this.Height + "\nBase: " + this.Base);
}
}
}
```

QUESTION#3 - [10 points]

A company plans to create a system for managing of a **movie** store. The movie store has a name, address and phone number. **Movies** are described with title , genre, year of creation, number of sold copies and list of songs. The **songs** are described with name and duration. Design a set of classes and relationship between each other, which models the data of the record company. Implement a **test** class, which demonstrates the work of rest of the classes.

OOP Theory (Final-Exam)

Name: Shahmeer Khan
Class ID: 106204
Std. ID: 12115.

Question no. 5;

Code;

```
using System;
using System.Collection.Generic;
using System.Linq;
using System.Threading.Tasks;
namespace Paper
{
  class Program
  {
    static void Main(string [] args)
    {
     Console.WriteLine("Enter Song Name: ");
     string name = Console.ReadLine();
     Console.WriteLine("Enter Artist's Nick Name: ");
     string Nick = Console.ReadLine();
     Console.WriteLine("Enter Movie Name: ");
     string movie = console.ReadLine();
     Console.WriteLine("Enter Movies Song Genre: ");
     string genre = console.ReadLine();
    Console.WriteLine("Enter Movie + Song Release Year: ");
    int year = int.Parse(Console.ReadLine());
    Console.WriteLine("Enter number of copies sold: ");
    int copies = int.Parse(Console.ReadLine());
    User Display u1 = new User Display(name, nick);
    User Display u2 = new User Display(movie, genre, year, copies);
    u1.Performer Details();
    u2.Movie_S_Songs_Details();
    Console.ReadKey();
  }
}
```

```
Class Company
{
 public string C_name;
 public string address;
 public string owner;
  string [] performers = new string [10];
}
class Performer : Company
{
  public string name;
  public string nickname;
  string [] Movie_s_Songs_Genre = new string [10];
}
class Movie : Performer
{
  public string M_name;
  public string Movie_s_songs_genre;
  public int creation year;
  public int no_of_sold_copies;
  string [] list_of_songs = new string [10];
}
class Song : Movie
{
  public string s_name;
  public double duration;
}
 //test class
class UserDisplay : Song
{
  public UserDisplay (string a, double b)
  {
    this.s_name = a;
    this.duration = b;
  }
```

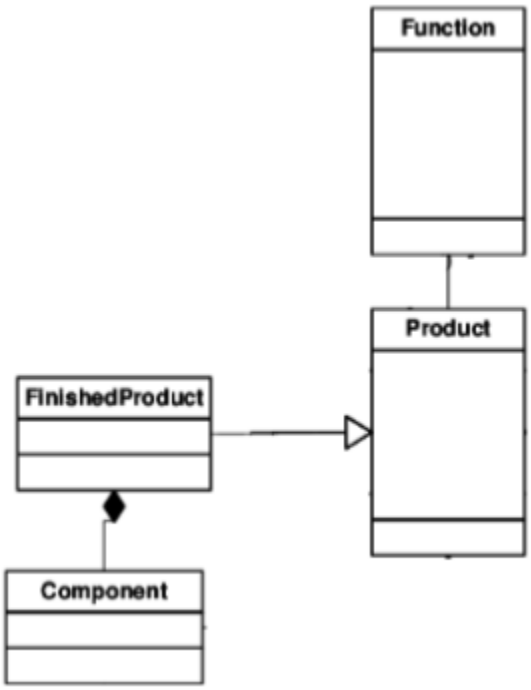
```
public void Song Details()
{
  Console.WriteLine("Song Name = " + s_name);
  Console.WriteLine("Song Duration = " + duration);
}
public User_Display(string s1, string s2, int s3, int s4)
{
  this.m_name = s1;
  this.Movie_s_songs_genre = s2;
  this.creation year = s3;
  this.no_of_sold_copies = s4;
}
public void Movie_s_Song_Details()
{
  Console.WriteLine("Album Name = " + m_name);
  Console.WriteLine("Genre = " + Movie_s_songs_genre);
  Console.WriteLine("Release Year = " + creation year);
  Console.WriteLine("Sales Numbers = " + no_of_sold_copies);
  Console.WriteLine("Enter the songs in the list:")
  for(int i = 1; i<=10; i++)
  {
    string a = Console.ReadLine();
    Console.WriteLine("0" + i + ". " + a);
  }
}
public User Display (string a1, string a2)
{
  this.name = a1;
  this.nickname = a2;
}
```

```
Public void PerformerDetails()
{
    Console.WriteLine("Singer = " + nickName);
    Console.WriteLine("Singer Name = " + name);
}
public UserDisplay(string b1, string b2, string b3)
{
    this.c_name = b1;
    this.address = b2;
    this.owner = b3;
}
public void CompanyDetails()
{
    Console.WriteLine("Seriously!!!! You are interested in Knowing "
        + "about the company???.");

    Console.WriteLine("Fine then.\n Company Name = " + c_name +
        "\n Company Address = " + address + "\n Company "
        + "Owner = " + owner);
}
}
}
```

QUESTION#4- **[10 points]**

Provide **structural code**only for the following class diagram, implementing all the relationships.



OOP Theory (Final-Exam)

Name: Shahmeer Khan.
Class ID: 106204
Std. ID: 12113

Question no. 4;

Code;

```
using System;
using System.Collection.Generic;
using System.Linq;
using System.Threading.Task;
namespace Paper
{
  class Program
  {
    static void Main(string[]args)
    {

      Console.ReadKey();
    }
  }
class Product
{
    //2 way Association - pt1
    public Function f1;
    public void definefunction()
    {
      Console.WriteLine("Product end");
      f1 = new Function();
    }
  }
class FinishedProduct: Product
{
  //composition - owner.
```

```
    Compocat obj = new Compocat();
    public void fpcompo()
    {
      obj.Product Compocat();
    }
}
class Function
{
  // 2 way association - pt2
  public Product p1;
  public void defineProduct()
  {
    Console.WriteLine("Function end");
    p1 = new Product();
  }
}
class Component
{
  public void Product Componcat()
  {
    Console.WriteLine("The Componcats are here!");
  }
}
}
```

QUESTION#5 - [10 points]

Answer the following parts:

1. How an abstract class differs from an Interface?
2. Explain the concept of Composition and Association class relationships.
3. How Object-Oriented Programming differs from procedural programming?
4. Suppose a case scenario of an Animal with two of its type, Cat and Dog. Explainwhich one of these is the incorrect procedure to instantiate an object of typeanimal and why?
   1. Animal c = new Cat();
   2. Animal d = new Dog();
   3. Cat c1 = new Dog();
   4. Dog d1 = new Animal();
5. What are virtual functions?