Academic Year: 2019 - 2020	Semester: First
Day and Date: Monday, 2/12/2019	Level: 2nd level
Examiner: Afaf Bin Saadon	Time allowed: 1 hour
Subject: Object-Oriented Programming	Department: IT
Student Name:	

(Q1) Write the letter of the correct answer in the space provided. **[3 marks]**

1. If different properties and functions of a real world entity are grouped into a single element, what is it called in OOP language? _____
   (a) Encapsulation   (b) Inheritance   (c) Polymorphism   (d) Abstraction

2. How many base classes can a single class inherit in C#? _____
   (a) 1   (b) 2   (c) 3   (d) As many as required

3. Members which are not intended to be inherited are declared as _____.
   (a) Public members   (b) Protected members
   (c) Private members   Public + Project   (d) Private or Protected members

(Q2) Fill in the blanks: base class known super. class   **[4 marks]**

1. More than one class being parent of single child is called __multiple__ inheritance.

2. The abstract method must be implemented in __all non-Abstract__ class and declared only in __Program__ class.

3. __Encapsulation__ is a type that specifies the methods and properties that a class which implements it must provide.

(Q3) What will be the output of the following C# code? Justify your answer.

[3 marks]

```
class A : D {
    public override void print() { Console.Write("A"); }
}
class C {
    public void print() { Console.Write("C"); }
}
class B : C {
    public void print() { Console.Write("B"); }
}
class D {
    public virtual void print() { Console.Write("D"); }
}
```

```
class Program {
    static void Main(string[] args) {
        A a = new A();
        a.print();
        B b = new B();
        b.print();
        C c = new B();
        c.print();
        D d = new A();
        d.print();
    }
}
```

Output is ↓

"ABCD"

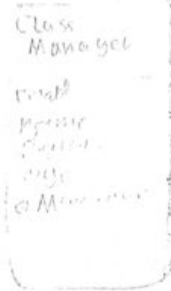B → But There Is No Constructer.

(Q4) Consider the following class definition:

```
class Manager {
    public string name;
    public double salary;
    public int age;
    public Manager(string name) {
        this.name = name;
    }
}
```

where the salary of any manager should be between 100000 and 200000, and the age should not be less than 30.

[1 mark]

a. Draw the UML class diagram of this class.

Class
Manager

name
salary
age
a Man....

b. In what way does this piece of code violate the principle of encapsulation? [2 marks]

In field name ffmost be Pti

all field are public .

In encapsulation, most be Privete or Prodect
failed

c. Modify the definition of this class to adhere to encapsulation principle.   [2 marks]

```
Class Manager {
    Privet string name;
    Privet double salary;
    Privet int age;
    Puplic Manger (sting nam) {
        this.nam = name; }

                salary
    Puplic double { get ; set; }
    Puplic int age { get ; set; }

}
```

كلية الحاسبات وتقنية المعلومات
College of Computers & Information Technology

Academic Year: 2019 - 2020	Semester: First
Day and Date: Monday, 28/10/2019	Level: 2nd level
Examiner: Afaf Bin Saadon	Time allowed: 1 hour
Subject: Object-Oriented Programming	Department: ....
Student Name:	

(Q1) Write the letter of the correct answer in the space provided.   [5 marks]

1. Which access modifier is usually used for data members of a class? _____
   (a) Public   (b) Private   (c) Protected   (d) Internal

2. How many classes can be defined in a single program? _____
   (a) Only 1   (b) Only 5   (c) Only 3   (d) As many as you want

3. Which definition best describes an object? _____
   (a) Instance of a class   (b) Child of a class
   (c) Instance of itself   (d) Overview of a class

4. The correct way of incrementing the operators are: _____
   (a) ++ a ++   (b) b ++ 1   (c) c =+ 1   (d) d += 1

5. Which is most appropriate comment on following class definition: _____
   class Student {
       int a;
       public float a; }
   (a) It is correct   (b) Error: same variable name can't be used twice
   (c) Error: Public must come first   (d) Error: data types are different for same variable

(Q2) Determine whether each of the following statements is true or false, then correct the wrong statements.   [5 marks]

1. If a class has 4 constructors then it must have 4 destructors.   (False)
   الصنف الواحد يحتوي على منشئات متعددة ولكن الهادم/المدمر can have one at most.

2. The members of an object are accessed using member names directly.   (False)
   Class   جملة ⟵ object
                  sentnx

3. Classes may not have both data members and member functions.   (False)
   may have.

4. Member functions can be made private.   (True)

5. Default constructor can't be defined by the programmer.   (False)
   can.

(Q3) What will be the output of the following C# code? [5 marks]

A)

```
static void Main(string[] args)
{
    int i, j;
    int[,] arr = new int[4,3];
    for (i = 0; i < 4; i++)
    {
        for (j = 0; j < 3; j++)
        {
            arr[i,j] = i + j * 2;
            Console.Write(arr[i,j] + " ");
        }
        Console.WriteLine();
    }
}
```

B)

```
static void Main(string[] args)
{
    int i, j;
    for (i = 1; i <= 3; i++)
    {
        j = 1;
        while (i % j == 2)
        {
            j++;
        }
        Console.WriteLine(i + " " + j);
    }
}
```

Good Luck ☺

Academic Year: 2019 - 2020   Semester: First
Day and Date: Monday, 11/11/2019   Level: 2nd level
Examiner: Afaf Bin Saadon   Time allowed: 1 hour
Subject: Object-Oriented Programming   Department: ....
Student Name: ....

(Q1) Write the letter of the correct answer in the space provided.   **[3 marks]**

1. Which syntax for class definition is wrong? _____
   (a) class Student { }   (b) Student class { }
   (c) class Student { public Student(int a) { } }   (d) class Student { Student(int a) { } }

2. Which among the following is correct syntax for the destructors? _____
   (a) classname( )   (b) ( )classname   (c) ~classname( )   (d) -classname( )

3. For constructor overloading, each constructor must differ in _____.
   (a) Number of arguments and type of arguments   (b) Return type and type of arguments
   (c) Number of arguments and return type   (d) Return type and definition

(Q2) Determine whether each of the following statements is true or false, then correct the wrong statements.   **[3 marks]**

1. Default constructor must be defined, if parameterized constructor is defined and the object is to be created without arguments.   (True)

   _____

2. Public members are accessible from other classes.   (True)

   _____

3. There is at least one destructor in the class.   (False)
   لايوجد
   _____ Cannot be more than one _____

(Q3) Fill in the blanks: **[4 marks]**

1. Con structur _chaing_ invoke one constructor from another constructor.

2. _Class_ is a data type that defines a set of variables and methods for a declared object.

3. Creating an object is called _Instantiation_.

4. _this key word_ is used inside the class, and refers to the current instance (object) of the class.

(Q4) What will be the output of the following C# code?   [2 marks]

```csharp
static void Main(string[] args)
{
    int i, j;
    for (i = 2; i >= 0; i--)
    {
        for (j = 0; j <= 2; j++)
        {
            if (i == j)
                Console.Write("1 ");
            else
                Console.Write("0 ");
        }
        Console.WriteLine();
    }
}
```

[handwritten annotations:]

2

1 1

0 1 2

0 0 1

2i | 0 0 1

1i | 0 1 0

0i | 1 0 0 → output

(Q5) Create Class from the following Main & output?   [3 marks]

```csharp
static void Main(string[] args)
{
    Employee e1 = new Employee();
    Employee e2 = new Employee("Ahmed", 40);
    Employee e3 = new Employee("Ali", 35, "Microsoft");
}
```

Output:
```
I am an Employee.
I am an Employee.
Name: Ahmed
Age: 40
I am an Employee.
Name: Ali
Age: 35
Company: Microsoft
```

[handwritten answer:]

```
Class Employee {
    string company;
    string name;
    int age;
    public Employee(){
        Console.WritLine("I am an Employee.");}
    public Employee(string name, int age): this(){
        this.name = name
        this.age = age
        Console.writeLine("Name: " + name + "\n" + "Age: "+ age)
    }
    public Employee(string name, int age, string company): this(name,...
    {
        this.company = company;
        Console.WritLine("Company: " + company)}
    }
```

Good Luck ☺

Academic Year: 2019 - 2020
Day and Date: Monday, 28/10/2019
Examiner: Afaf Bin Saadon
Subject: Object-Oriented Programming
Student Name: ....

Semester: First
Level: 2nd level
Time allowed: 1 hour
Department: ....

(Q1) Write the letter of the correct answer in the space provided.   [5 marks]

1. Which of the following best defines a class? _____
   (a) Parent of an object   (b) Instance of an object ✓
   (c) Blueprint of an object ✗   (d) Scope of an object

2. The default access modifier for data members or member functions declared within a class without any modifier in C# is _____.
   (a) Public   (b) Private   (c) Protected   (d) Internal

3. Which among the following is correct? _____
   (a) class student { public int student( ) { } } ✗   (b) class student { public void student( ) { } }
   (c) class student { public student ( ) { } }   (d) class student { public student( ) { } }

4. The correct way of decrementing the operators are:
   (a) a++   (b) b ++ 1   (c) c -= 1   (d) d =- 1

5. How many objects can be declared of a specific class in a single program? _____
   (a) 3   (b) 5   (c) 1   (d) As many as you want

(Q2) Determine whether each of the following statements is true or false, then correct the wrong statements.   [5 marks]

1. Pure OOP can be implemented without using class in a program.   (False)
                                                                          True
   ....

2. Class can have only member functions with no data members.   (True)
   ....

3. Destructor is a function which is called whenever an object is created to initialize the members.   (Fais)
   Constraction:
   ....

4. Default constructor can be called explicitly.   (False)
                                                         True
   ....

5. Private modifier must be used before public modifier.   (False)
   Can
   ....

(Q3) What will be the output of the following C# code? [5 marks]

A)

```
static void Main(string[] args)
{
    int i;
    for (i = -3; i <= 3; i++)
    {
        switch (i)
        {
            case 0:
                Console.WriteLine("zero");
                break;
        }
        if (i > 0)
            Console.WriteLine("A");
        else if (i < 0)
            Console.WriteLine("B");
    }
}
```

(handwritten annotations)

i = -3 -2 -1 0 1 2 3

B B B zero

A A A

B
B
B
zero
A
A
A

outPut

B)

```
static void Main(string[] args)
{
    int i, j;
    int[,] arr = new int[3,3];
    for (i = 0; i < 3; i++)
    {
        for (j = 0; j < 3; j++)
        {
            arr[i,j] = i * 2 + i * 2;
            Console.Write(arr[i,j] + " ");
        }
        Console.WriteLine();
    }
}
```

Good Luck ☺

Academic Year: 2019 - 2020
Day and Date: Tuesday, 3/12/2019
Examiner: Afaf Bin Saadon
Subject: Object-Oriented Programming
Student Name: ....

Semester: First
Level: 2nd level
Time allowed: 1 hour
Department: CS

(Q1) Write the letter of the correct answer in the space provided.   [3 marks]

كيف يتم تطبيق الكبسلة للبشن

1. How can Encapsulation be achieved? _____

   (a) Using access modifiers   (b) Using inheritance

   (c) Using only private members   (d) Using abstraction

2. Which type of members can't be accessed in derived classes of a base class? _____

   (a) Protected   (b) Private   (c) Public   (d) All can be accessed

كم عدد الكلاس المشتقة التي يمكن للكلاس الرئيسي أن يحتوي

3. How many derived class can a single base class have? _____

   (a) 1   (b) 2   (c) 3   (d) As many as required

(Q2) Fill in the blanks: [4 marks]

1. One base class derives another class is called __MuHiPle__ inheritance.

2. Method only declared in base class is called __function__.

3. A base class is also known as __Program / Parent__ class.

4. In late binding, the decision of which method is to be called is made at __Runtime__.

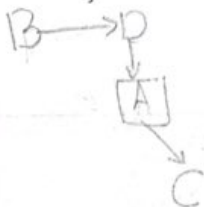**(Q3) What will be the output of the following C# code? Justify your answer.**

[3 marks]

```
class A : D {
    public A() { Console.Write("A"); }
}
class B {
    public B() { Console.Write("B"); }
}
class C : A {
    public C() { Console.Write("C"); }
}
class D : B {
    public D() { Console.Write("D"); }
}
```

```
class Program {
    static void Main(string[] args) {
        A a = new A();
        B b = new B();
        C c = new C();
        D d = new D();
    }
}
```
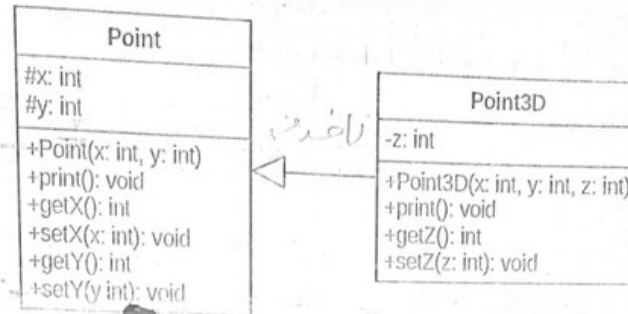
B → D
A
C

Error   A B C D

'BDABBD ACBD'

Q4) Consider the following UML diagram: **[5 marks]**

```
        Point
------------------------
#x: int
#y: int
------------------------
+Point(x: int, y: int)
+print(): void
+getX(): int
+setX(x: int): void
+getY(): int
+setY(y int): void


        Point3D
------------------------
-z: int
------------------------
+Point3D(x: int, y: int, z: int)
+print(): void
+getZ(): int
+setZ(z: int): void
```

Convert the above diagram to C# code, using the following details:

1. Use constructor chaining in Point3D class.
2. Use overriding to implement print() method, which prints Point in (x, y) format, and prints Point3D in (x, y, z) format.
3. Overload the operator + in Point class such that the summation of two points is (summation of x coordinates, summation of y coordinates).

Good Luck ☺

Academic Year: 2019 - 2020

Semester: First

Day and Date: Monday, 2/12/2019

Level: 2nd level

Examiner: Afaf Bin Saadon

Time allowed: 1 hour

Subject: Object-Oriented Programming

Department: IT

Student Name: ....

(Q1) Write the letter of the correct answer in the space provided. **[3 marks]**

1. If a method can perform more than 1 type of tasks, where the method name remains same, which feature of OOP is used here? _____
   (a) Encapsulation   (b) Inheritance   (c) Polymorphism   (d) Abstraction

2. How many abstract classes can a single program contain? _____
   (a) At most 1   (b) At least 1   (c) At most 3   (d) As many as required

3. How to make a derived class a base class? _____
   (a) Change name of the class   (b) Make a class derive from it
   (c) Use keyword base   (d) Can't be done

(Q2) Fill in the blanks: **[4 marks]**

1. Constructor is called automatically to initialize the class before the first instance is created.

2. A class being derived from another derived class is called _Child_ inheritance.   *(subclass)*

3. The virtual method must be declared and defined in _____ class and overridden in _____ class.

(Q3) What will be the output of the following C# code? Justify your answer.

[3 marks]

```csharp
class A {
    public void print() { Console.Write("A"); }
}
class B {
    public virtual void print() { Console.Write("B"); }
}
class C : A {
    public void print() { Console.Write("C"); }
}
class D : B {
    public void print() { Console.Write("D"); }
}
```

```csharp
class Program {
    static void Main(string[] args) {
        A a = new C();
        a.print();
        B b = new D();
        b.print();
        C c = new C();
        c.print();
        D d = new D();
        d.print();
    }
}
```

(Q4) Consider the following class definition:

```
class Employee {
    public string name;
    public double salary;
    public string company;
    public Employee(string name, string company) {
        this.name = name;
        this.company = company;
    }
}
```

where the name should be set only once, and the salary of any employee should be between 30000 and 60000.

[1 mark]

a. Draw the UML class diagram of this class.

b. In what way does this piece of code violate the principle of encapsulation? [2 marks]

c. Modify the definition of this class to adhere to encapsulation principle.   [2 marks]

(Q1) Write the letter of the correct answer in the space provided. [3 marks]

1. Which among the following can't be used for polymorphism? _____ فرورالسكان
   - (a) Static member functions
   - (b) Member functions overloading
   - (c) Predefined operator overloading
   - (d) Constructor overloading

2. An abstract class is always a _____ class.
   - (a) Base
   - (b) Derived
   - (c) Static
   - (d) Nested

3. If there is a derived class in a program, how many classes must be in that program? _____
   - (a) 1
   - (b) 2
   - (c) 3
   - (d) 4

(Q2) Fill in the blanks: [4 marks]

1. A derived class is also known as ___Subclass___ class.

2. If a base class is being derived by two other classes, it is called ___Multiple___ inheritance.

3. In early binding, the decision of which method is to be called is made at ___Compile time___

4. ___Property___ is a member that provides a flexible mechanism to read or write.

(Q3) What will be the output of the following C# code? Justify your answer. [3 marks]

```
class A : C {
    public A() { Console.Write("A"); }
}
class B : D {
    public B() { Console.Write("B"); }
}
class C {
    public C() { Console.Write("C"); }
}
class D : A {
    public D() { Console.Write("D"); }
}
```
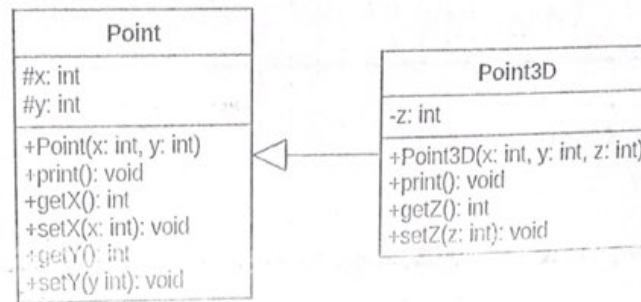
```
class Program {
    static void Main(string[] args) {
        A a = new A();
        B b = new B();
        C c = new C();
        D d = new D();
    }
}
```

CAC ADBCCAD

(Q4) Consider the following UML diagram: [5 marks]

```
        Point
 ┌─────────────────────────┐
 │ #x: int                 │
 │ #y: int                 │
 ├─────────────────────────┤
 │ +Point(x: int, y: int)  │
 │ +print(): void          │
 │ +getX(): int            │
 │ +setX(x: int): void     │
 │ +getY(): int            │
 │ +setY(y int): void      │
 └─────────────────────────┘

              Point3D
      ┌──────────────────────────────┐
      │ -z: int                      │
      ├──────────────────────────────┤
      │ +Point3D(x: int, y: int, z: int) │
      │ +print(): void               │
      │ +getZ(): int                 │
      │ +setZ(z: int): void          │
      └──────────────────────────────┘
```

Convert the above diagram to C# code, using the following details:

1. Use constructor chaining in Point3D class.
2. Use overriding to implement print() method, which prints Point in (x, y) format, and prints Point3D in (x, y, z) format.
3. Overload the operator + in Point class such that the summation of two points is (summation of x coordinates, summation of y coordinates).

Good Luck ☺

(Q1) Write the letter of the correct answer in the space provided. **[6 marks]**

4, 5

1. Which definition best describes an object? _____
   (a) Instance of a class
   (b) Child of a class
   (c) Instance of itself
   (d) Blueprint of a class

2. What is the return type of constructors? _____
   (a) int
   (b) float
   (c) void
   (d) none of the mentioned

3. The method used to remove white space from a string is __d__ .
   (a) Split()
   (b) Substring()
   (c) Remove()
   (d) Trim()

4. In which access should a constructor be defined, so that object of the class can be created in any function? _____
   (a) private
   (b) public
   (c) protected
   (d) internal

(Q2) Determine whether each of the following statements is true or false, and then correct the wrong statements. **[6 marks]** 4

1. The var variables must be initialized at the time of declaration. (F)

   Counstant field

2. Default constructor must be defined, if parameterized constructor is defined and the object is to be created without arguments. (T)

3. A write-only property will have only write accessor. (T)

4. A destructor can be overloaded. (F)

   Cann't but censtructor can be

5. The ushort data type is 16-bit signed integer. (T)

   short   int 2^   Long 64^

6. You can access static members using an object. (F)

   only Cannot

(Q4)

(Q3) Fill in the blanks: [3] **[6 marks]**

1. __Class__ is a data type that defines a set of variables and methods for a declared object.

2. Use __List method.__ or __array__ methods to remove elements from ArrayList.
   Remove() RemoveAll()

3. Constructor __overlodeing__ is a special function that is called to free the resources acquired by the object. destructor

4. __Encapsulation__ is a technique to hide the data of a class using __accesse modifier__ Privet.

(Q4) Write three differences between static constructor and non-static constructor? **[6 marks]** [6]

Static Constructor	Non-Static Constructor
most be one In all Programe	Can Creat as many requaier
Invok In one more time. in plgspe once.	Invokelt In each Great Instanc
with with static field only with out accessmodifire	Use with staiic field and non static. with accesse modifier.

(Q5) What are the values of (x) and (y) in each iteration of the following C# code? **[6 marks]** [6]

```
static void Main(string[] args)
{
    int[] arr = {2, 4, 6, 5, 3, 1};
    int i = 0, j = 5;
    int x = 0, y = 0;
    while (i < 6)
    {
        x = arr[i] + i++;
        y = arr[j] + --j;
        Console.WriteLine(x + "  " + y);
    }
}
```

Iteration	x	y
1	2	5
2	5	6
3	8	7
4	8	7
5	7	4
6	6	1

Bonus: [5 marks]

What are the errors in the following code? Write the errors with their correction in the table below.

[handwritten: 3.5]

```
class Test
{
    public int X { get; set; };
    public int Y { get; };   ① [handwritten: ① void]
    public (int) add()       [handwritten: ① void]
    {
        .Console.WriteLine(x + y);
    }
}

class Program
{
    static void Main(string[] args)
    {
        Test t = new Test();
        t.X = 5;
     ① t.Y = 10;
     ② add();
        Console.WriteLine(t.X + "   " + t.Y);
    }
}
```

[handwritten on right side:]

Class Test
{
  Public Int X { get {return x} }
               { set } { x = valu } }
  Public In Y { get } {return y }
               Set { Y = value }
}
Public void add ( ) {
  Console.writeLine(x+Y);
}

t. add ( );

[handwritten Arabic note]

[handwritten under code: Ther is no reser for t x]

Error	Correction
1) Public Int add()	Public void add()
2) t.Y = 10; If i want to accesse variable →	C Ther is No set accessior. Public Int Y { get; set } X
3) add();	3- mostUse Instans to call member of class like that t.add();
4) Console.writeLine(t.x .... t.y);	. Ther is No retern In code - get { retern X }

Good Luck ☺ - get { retern Y }