



National University of Computer & Emerging Sciences, Karachi
Fall 2021 (School of Computing)
Midterm I Examination



Course Code: CS-4042	Course Name: Information Processing Techniques
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Student ID:	Section:
Date: October 15, 2021	Time: 9 am - 10 am (60 minutes)

Instructions:

- Attempt all questions
- The paper contains 4 questions on 3 pages.
- Return the paper after the exam.

Max Points: 40
(10 Points)

Question 1: Multiple Choice Questions

1. What is unboxing?

- | | |
|---|---|
| a) Encapsulating an object in a value type. | c) Encapsulating a value type in an object. |
| b) Encapsulating a copy of an object in a value type. | d) Encapsulating a copy of a value type in an object. |

2. Different ways a method can be overloaded in C#.NET

- | | |
|------------------------------------|------------------------------------|
| a) Different parameter data types. | c) Different number of parameters. |
| b) Different order of parameters. | d) All of above. |

3. Which of the following statements are correct about an interface used in C#.NET?

- a) An interface can contain properties, methods and events.
- b) The keyword must implement forces implementation of an interface.
- c) Interfaces can be overloaded.
- d) Interfaces can be implemented by a class or a struct.
- e) Enhanced implementations of an interface can be developed without breaking existing code.

4. Which of these data type values is returned by equals() method of String class?

- | | | | |
|---------|--------|------------|-------------------------|
| a) char | b) int | c) Boolean | d) all of the mentioned |
|---------|--------|------------|-------------------------|

5. Which of the following statements are correct about a namespace used in C#.NET?

- I. Classes must belong to a namespace, whereas structures need not.
 - II. Every class, struct, enum, delegate and interlace has to belong to some or the other namespace.
 - III. All elements of the namespace have to belong to one file.
 - IV. If not mentioned, a namespace takes the name of the current project.
 - V. The namespace should be imported to be able to use the elements in it.
- | | | | |
|--------------|-----------------|--------------|------------|
| a) I and III | b) II, IV and V | c) III and V | d) IV only |
|--------------|-----------------|--------------|------------|

6. Which of the following is not a function defined in the ServiceBase Class?

- | | | | |
|--------------|---------------|--------------|-----------------|
| a) onStart() | b) onResume() | c) onPause() | d) onContinue() |
|--------------|---------------|--------------|-----------------|

7. Which of the following statements are correct?

- I. A struct can contain properties.
 - II. A struct can contain constructors.
 - III. A struct can contain protected data members.
 - IV. A struct cannot contain methods.
 - V. A struct cannot contain constants.
- | | | | |
|-------------|----------------|-----------------|--------------|
| a) I and II | b) III, and IV | c) I, II and IV | d) III and V |
|-------------|----------------|-----------------|--------------|

8. XML uses the features of

- | | | | |
|---------|----------|--------|---------|
| a) HTML | b) XHTML | c) VML | d) SGML |
|---------|----------|--------|---------|

9. If s1 and s2 are references to two strings, then which of the following is the correct way to compare the two references?

- a) s1 is s2
- b) s1 == s2
- c) s1 === s2
- d) s1.Equals(s2)
- e) strcmp(s1, s2)

10. Which of the following forms of applying an attribute is correct?

- a) < Serializable() > class sample
 { /* ... */ }
- b) (Serializable()) class sample
 { /* ... */ }
- c) [Serializable()] class sample
 { /* ... */ }
- d) Serializable() class sample
 { /* ... */ }
- e) None of the above.

Question 2: State the following as True or False and in case of false, justify your answer. (5 Points)

1. JIT compiler is a part of the common language runtime which compiles and converts all components to native code.
2. Boolean in C# takes 1 byte.
3. To install a windows service, following command can be executed:
installutil /u <service.exe>.
4. CTS describes how to represent entities in the .NET Metadata format
5. Currency is a reference type datatype in C#.

Question 3: Answer the following questions briefly.

1. Explain the following the following terminologies: (3 Points)
 - a) Abstraction in terms of a Mobile Phone
 - b) Encapsulation in terms of a Multi-national Company
 - c) Boxing v/s Unboxing
2. Considering a C# code, explain the CLR Execution Model. (3 Points)
3. Explain the process of serialization and deserialization and write the required C# class(es) and object which would represent the following XML: (3 Points)

```
<?xml version="1.0"?>
<ArrayOfEmployee xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <Employee>
    <Name>Ahmed</Name>
    <Age>21</Age>
    <isNewEmployee>false</isNewEmployee>
    <skillSet>
      <Skills>
        <skillTitle>Web Development</skillTitle>
        <experience>3</experience>
      </Skills>
      <Skills>
        <skillTitle>Mobile Development</skillTitle>
        <experience>2</experience>
      </Skills>
    </skillSet>
  </Employee>
  <Employee>
    <Name>Aslman</Name>
    <Age>22</Age>
    <isNewEmployee>false</isNewEmployee>
    <skillSet>
      <Skills>
        <skillTitle>Graphics Designing</skillTitle>
        <experience>5</experience>
```

```

</Skills>
</skillSet>
</Employee>
</ArrayOfEmployee>

```

4. Identify the Error(s) if any in given below scenarios. If there is any error, propose a solution (3 Points) to overcome the error(s).

a)

Assembly One	Assembly Two
<p>Assume that we have created a Class Library in Assembly One.</p> <pre> 1. namespace AssemblyOne 2. { 3. public class Customer 4. { 5. internal int CNIC; 6. } 7. }</pre>	<p>Assume that we have created a console application in Assembly Two and taking the reference of the Class library created in Assembly One.</p> <pre> 1. namespace AssemblyTwo 2. { 3. public class Shop 4. { 5. public static void Main(string[] args) 6. { 7. AssemblyOne.Customer c1 = new Customer(); 8. c1.CNIC= 41245; 9. Console.WriteLine(c1.CNIC); } 10. } 11. }</pre>

b)

Assembly One	Assembly Two
<p>Assume that we have created a Class Library in AssemblyOne.</p> <pre> 1. namespace AssemblyOne 2. { 3. public class Human 4. { 5. protected internal string name; 6. } 7. }</pre>	<p>Assume that we have created a console application in AssemblyTwo and taking the reference of the Class library created in AssemblyOne.</p> <pre> 1. namespace AssemblyTwo 2. { 3. public class Customer : Human 4. { 5. public void Set() 6. { 7. name = "Azeem"; 8. Console.WriteLine(name); } 10. }</pre>

Question 4: Explain the following questions. You may use diagrams where necessary.

1. Explain with example how Windows Services are different from a Console Application? (5 Points)
2. A local virtual software house needs to implement ASCII based message level encryption (8 Points) within a windows service. The output would be list of sorted encrypted words with the count of each word against them. Your university has recommended you for this task. Write a C# code snippet which will encrypt a text based on the following assumption:
 - Input can contain any alphabet or number
 - You cannot use any third-party encryption functions.

Sample Input 1: Welcome to IPT

Output 1: KPV = 1, Vo = 1, YeNcQmG = 1

Sample Input 2: Pull up if I pull up

Output 2: K = 1, kf = 1, RuNI = 2, Wp = 2

Sample Input 3: Transforming Data

Output 3: FaVa =1, VrCnUfQrOiPg = 1

BEST OF LUCK!