

## Quiz 2 solution

Write your name on the exam. Write something for every question. Students who do not write something for everything lose out over students who write down wild guesses. You will get some points if you attempt a solution but nothing for a blank sheet of paper. Write something down, even wild guesses. Problems take long to read but can be answered concisely.

Problem	Maximum	Score
1	16	
2	4	
Total	20	

## Problem 1 – C# language features

Briefly explain the following terms/techniques, and briefly discuss differences between the two members of each pair.

a) (4 points) Base classes versus interfaces

*A class can inherit from a base class and implement an interface. The main similarity is that an instance of this class can be used where an instance of the base class or an object implementing the interface is expected. The main difference is that base classes can define methods and fields available to the derived class whereas interfaces contain just declarations for methods, never implementations for them.*

b) (4 points) Static methods versus non-static methods

*Static methods are associated with the class, not with an object that is an instance of the class. Thus they can be invoked without creating an object, just through the class name whereas for non-static methods you need an object instance. Because there is no object instance associated with static methods, inside static methods you cannot access non-static fields or use the “this” keyword whereas in non-static methods you can.*

c) (4 points) Overloading a method versus overriding a method

*Overloading a method means creating a different method with the same name, but a different parameter list. Overriding a method means defining a method in a derived class that will replace the method from the base class.*

d) (4 points) Fields using the `readonly` keyword versus read only properties without a `set` accessor

*With the “readonly” keyword you can disallow assignments to a field anywhere other than inside a constructor for the class. By using properties that have the `get` accessor only, no portion of the application can assign to the property, but all methods in the class can update the fields the `get` accessor reads when computing the value of the property.*

## Problem 2 – Regular expressions

Give the regular expressions that match the strings defined below. For each definition, the regular expression you give must match the strings it describes without matching any string that does not fit the definition.

a) (1 point) Strings that end with the letter e followed by one or more digits

$e[0-9]^+ \$$

b) (1 point) Strings that contain only characters that are neither upper case letters, nor lower case letters nor digits

$^[^a-zA-Z0-9]^ \$$

c) (1 point) Strings that contain the substring alpha followed by the substring beta

$alpha.*beta$

d) (1 point) Strings that contain the substrings alpha and beta in any order

$(alpha.*beta)|(beta.*alpha)$