01 Introduction to C# and Data Types

Understanding Data Types

Test your Knowledge

1. What type would you choose for the following "numbers"?
- A person's telephone number
  It depends on the format.
  If there is no (), -, just numbers like 6461112222, then uint.
  If the format is some like (646)111-2222, not just numbers, then string
- A person's height
  It depends on the format.
  If the unit is cm or inches, such as 180cm or 70 inches, then byte is enough.
  If it has more precision such as 180.5cm, 70.5 inches, or unit in m or feet such as 1.8m or 6.5 feet, then we should use float.
  If the format is something 6'5", not just numbers, then we have to use string
- A person's age
  uint
- A person's gender (Male, Female, Prefer Not To Answer)
  Enum
- A person's salary
  uint
- A book's ISBN
  String
- A book's price
  It depends on the price format.
  If it is whole dollar, such as 80 USD, then ushort is enough.
  If the store would like to set the price to be 79.99 USD, then float.
- A book's shipping weight
  float.
- A country's population
  uint
- The number of stars in the universe
  ulong
- The number of employees in each of the small or medium businesses in the United Kingdom (up to about 50,000 employees per business)
  ushort
2. What are the difference between value type and reference type variables? What is boxing and unboxing?

Value Types	Reference Types

Directly contain their data	Store references to their data (Known as objects)
Each has its own copy of data	Two reference variable can reference the same object
Operation on one can not effect another	Operation on one can effect another

Boxing is to convert value type data to reference type data, such reference type(memory address) is like a box.

Unboxing is to convert reference type data to value type.

3. What is meant by the terms managed resource and unmanaged resource in .NET

   Managed resources are those that are pure .NET code and managed by the runtime and are under its direct control.

   Unmanaged resource is usually used to describe something not directly under the control of the garbage collector.

4. What's the purpose of Garbage Collector in .NET?

   Garbage collector will manage the allocation and release of memory for the application.

Test your Knowledge

1. What happens when you divide an int variable by 0?

   No compile errors, but it will throw an exception:

   Unhandled exception. System.DivideByZeroException: Attempted to divide by zero.

2. What happens when you divide a double variable by 0?

   No compile errors.

   If the number is 0, it will result NaN (Not A Number)

   If the number is positive, it will result inf.

   If the number is negative, it will result –inf.

3. What happens when you overflow an int variable, that is, set it to a value beyond its range?

   If just assign the value, such as int a = 2147483648, there could be an compile errors. The compiler will consider 2147483648 as an uint type, and gives the error Cannot implicity convert type 'uint' to 'int'.

   If doing some calculation, like a++, it will doing like a round.

   If a = 2147483647, then a++ will result -2147483648.

4. What is the difference between x = y++; and x = ++y;?

   y++ will first assign the value of y to x, then increase y by 1.

   y++ will first increase y by 1, then assign the value of y to x.

5. What is the difference between break, continue, and return when used inside a loop statement?

Break will terminate the whole loop and execute the statement right after the loop.

Continue will terminate the current iteration and continue to the condition/increase for for loop, the condition check for while and do…while loop.

Return will return a value to the method and terminate the entire invoke.

6. What are the three parts of a for statement and which of them are required?
   Initialize, condition, and increasement.
   None of them are required.

7. What is the difference between the = and == operators?
   = is the assignment operator, == is logical operator.

8. Does the following statement compile? for (; true;) ;
   Yes. But it is an infinite loop.

9. What does the underscore _ represent in a switch expression?
   It plays the same role as default. If none of the cases are satisfied, then will execute the block in _.

10. What interface must an object implement to be enumerated over by using the foreach statement?
    The IEnumerator interface provides iteration over a collection-type object in a class. The IEnumerable interface permits enumeration by using a foreach loop