# Unit Test #1

**Due Sunday Week #5 11:59pm**

1. Create a console application that enhances the attached "Math Quiz Application" to include division. Note that you will have to replace the **int** variables with **doubles** and you should round the quotient to 2 decimal places and indicate that the user should enter their answer to 2 decimal places. (dAnswer = Math.Round(dAnswer,2))

GitHub URL: <https://github.com/ndw1117/myIGME-201>

1. Create a console application that modifies the attached "Number Sorter" application to request sentences and sort the words in the sentence in ascending or descending alphabetical order.

Note that you cannot compare strings by using < or >.

You will have to use string1.CompareTo(string2) which:

* returns a negative number if string1 < string2
* returns a positive number if string1 > string2

GitHub URL: <https://github.com/ndw1117/myIGME-201>

1. Create a console application that uses a delegate to impersonate the Math.Round(double, int) function. (Refer to "Math Delegate", "MemoryGame" or the attached "Number Sorter" application for delegate code examples). 1 extra point will be given for each additional implementation you can demonstrate using abbreviated notation, anonymous methods, the lambda operator and/or the generic template type. (Up to 5 extra points are available!)

GitHub URL: <https://github.com/ndw1117/myIGME-201>

1. Write a console application that re-creates the attached 3questions.exe.

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1. Which of the following conversions can't be performed implicitly:
2. ulong to int
3. uint to long
4. bool to string
5. float to byte
6. Given the following namespaces:

namespace Worst

{

using When = Episode;

// name "Meme" defined

namespace Episode

{

// name "Ever" defined

}

}

// global code

1. How would you reference "Ever" from the global code?

Worst.Episode.Ever

1. How would you reference "Ever" from the "Worst" namespace using the alias?

When.Ever

1. How would you reference "Ever" from the "Episode" namespace?

Ever

1. How would you reference "Meme" from the global code?

Worst.Meme

1. How would you reference "Meme" from the "Worst" namespace?

Meme

1. How would you reference "Meme" from the "Episode" namespace?

Base.Meme

1. By considering operator precedence, list the steps involved in the computation of the following expression:

resultVar -= var1 + var2 \* var3 % var4 - var5;

resultVar = resultVar - (var1 + ((var2 \* var3) % var4) – var5);

1. Given the formula z = 4y3 + 2x2 - 8x + 7 implement a multidimensional array, the necessary for() loops and the code to store the values of z for the following ranges of x and y into the array:

* -1 <= y <= 1 in 0.1 increments
* 0 <= x <= 4 in 0.1 increments.

Use the delegate method you wrote in #3 to round x and y to 1 decimal, and z to 3 decimals

double x = 0;

double y = 0;

double z = 0;

int nX = 0;

int nY = 0;

double[,,] values = new double[41,21,3];

for (x = 0; x <= 4; x += 0.1, nX++)

{

x = myRound(x, 1);

nY = 0;

for (y = -1; y <= 1; y += 0.1, ++nY)

{

y = myRound(y, 1);

z = (4\*(Math.Pow(y, 3)))+(2\*(Math.Pow(x, 2)))-(8\*x) + 7;

z = myRound(z, 3);

values[nX, nY, 0] = x;

values[nX, nY, 1] = y;

values[nX, nY, 2] = z;

}

}

1. List all of the errors in the following code (Hint: there are 5 errors):

double[][] dArray = new int[2][]; Error #1

dArray[1] = new double[2];

dArray[2] = new double[1] Error #2, Error #3

dArray[0][0] = 15; Error #4

dArray[1][2] = 5.67; Error #5

1: Compile-Time Error: Should be new double, not int

2: Compile-Time Error: Need a semicolon

3: Runtime Error: Index out of bounds. Can’t declare dArray[2]. (2 is too high)

4: Runtime Error: Cannot set dArray[0][0] because 2nd dimension isn’t declared for dArray[0]

5: Runtime Error: Index out of bounds. Can’t declare dArray[1][2] (2 is too high)

1. a. What will happen if the following code executes and why?

byte byteVal;

short shortVal = -556;

byteVal = (byte)shortVal;

Console.WriteLine("byteVal = {0}", byteVal);

The system will print “byteVal = 212” because shortVal will be casted to a byte but will have lost bit data due to the negative value being too large.

b. What will happen if the following code executes and why?

byte byteVal;

short shortVal = -556;

byteVal = checked((byte)shortVal);

Console.WriteLine("byteVal = {0}", byteVal);

You will get an error because the overflow check has failed.

c. What will happen if the following code executes and why?

byte byteVal;

short shortVal = -556;

byteVal = Convert.ToByte(shortVal);

Console.WriteLine("byteVal = {0}", byteVal);

You will get an error because -556 is too large of a negative value to be converted to a byte.

1. Which of the following are NOT legal C# identifier names?

$salary Contains special character

MAX\_INT\_# Contains special character

99bottlesOfBeerOnTheWall Starts with a number

#hashtag Contains special character

excitement! Contains special character

good&evil Contains special character

1. Write a console application that has the following variable declarations:

string sName;

double dSalary = 30000;

It should prompt for the user's name, then call the following function:

static bool GiveRaise( string name, ref double salary )

The function should increase the salary by $19,999.99 if name = your name and return true

Otherwise it should return false.

The main program should congratulate the user if they got a raise, and display their new salary.

GitHub URL: <https://github.com/ndw1117/myIGME-201>

1. Rewrite #12 using the following struct:

struct employee

{

public string sName;

public double dSalary;

}

And rewrite the GiveRaise() function to pass the struct as the only parameter

GitHub URL: <https://github.com/ndw1117/myIGME-201>

1. Create a "Console App (.NET Framework)" called "UT1\_BugSquash". Paste the following code into the Program.cs file. Identify the compile-time, run-time and logical errors by commenting out the offending lines, explaining the type of error, and rewriting them correctly, or adding any additional code required to prevent any possible run-time or logical errors. Ensure the code is fixed to work as documented.

GitHub URL: <https://github.com/ndw1117/myIGME-201>

using System;

namespace UT1\_BugSquash

{

class Program

{

// Calculate x^y for y > 0 using a recursive function

static void Main(string[] args)

{

string sNumber;

int nX;

int nY

int nAnswer;

Console.WriteLine(This program calculates x^y.);

do

{

Console.Write("Enter a whole number for x: ");

Console.ReadLine();

} while (!int.TryParse(sNumber, out nX));

do

{

Console.Write("Enter a positive whole number for y: ");

sNumber = Console.ReadLine();

} while (int.TryParse(sNumber, out nX));

// compute the exponent of the number using a recursive function

nAnswer = Power(nX, nY);

Console.WriteLine("{nX}^{nY} = {nAnswer}");

}

int Power(int nBase, int nExponent)

{

int returnVal = 0;

int nextVal = 0;

// the base case for exponents is 0 (x^0 = 1)

if (nExponent == 0)

{

// return the base case and do not recurse

returnVal = 0;

}

else

{

// compute the subsequent values using nExponent-1 to eventually reach the base case

nextVal = Power(nBase, nExponent + 1);

// multiply the base with all subsequent values

returnVal = nBase \* nextVal;

}

returnVal;

}

}

}

## Submission

Upload this completed document and the GitHub URL's of the 7 related project folders for #1, 2, 3, 4, 12, 13 and 14 to the corresponding myCourses dropbox.