CS 11 Exercise 3
1st Semester, AY2018-2019

August 27, 2018

1 Instructions

- For this exercise, you have to write five different computer programs. A submission link is available in UVLe for each program.
- Make sure that your algorithm works given the sample input and output. You must also check if your algorithm can also handle input other than the ones given.
- Please remove any prompt messages (e.g. `Enter number:`) when getting input. Prompt messages will mess with your output, making your solution invalid.
- See the sample input and output to guide you on what and how your program must display output.
- Submit your solutions on or before Sunday, September 2 at 11:59pm.

2 Problems

1. *(2 points)* Write a program that outputs the result of the signum function, given an argument x. The signum of x, or $sgn(x)$, is defined as follows:

$$sgn(x) = \begin{cases} -1 & \text{if } x < 0 \\ 0 & \text{if } x = 0 \\ 1 & \text{if } x > 0 \end{cases}$$

   Your program must take a real number x for input and it must print the value of $sgn(x)$.

2. *(2 points)* Write a program that determines if a given year is a leap year. Your program must take an integer y for input, and it must print `LEAP YEAR` if y is a leap year, and `NOT A LEAP YEAR` if y is not a leap year. If $y < 1000$, your program must print `INPUT TOO SMALL`.

3. *(2 points)* Write a program that classifies a tropical cyclone, given the wind speed. Your program must take the wind speed (in floating point format) for input, and it must output the cyclone classification. Refer to the table for details.

Wind Speed	**Classification**
up to 61kph	`TROPICAL DEPRESSION`
more than 61kph and up to 88 kph	`TROPICAL STORM`
more than 88 kph and up to 117 kph	`SEVERE TROPICAL STORM`
more than 117 kph and up to 220 kph	`TYPHOON`
more than 220 kph	`SUPER TYPHOON`

4. *(2 points)* Write a program that indicates if a given number has more than two digits and is a multiple of 2, 3, or 5. Your program must take an integer for input and it must print `TRUE` if the number satisfies the conditions, and `FALSE` otherwise.

5. *(2 points)* Write a program that will determine if you can form a triangle given the lengths of three sides. Also determine what kind of triangle can be formed. Your program must take the lengths of the three sides (floating-point numbers) for input, and it must output the type of triangle that can be formed, or `INVALID` if the sides can't form a triangle. Refer to the table for details.

Properties	**Classification**
all sides have equal length	`EQUILATERAL TRIANGLE`
exactly two sides have equal length	`ISOSCELES TRIANGLE`
each side has a different length	`SCALENE TRIANGLE`
sides can't form a triangle	`INVALID`

   Hint: Apply the triangle inequality theorem.