WORKSHEET 6a

For this worksheet you are expected to work individually to complete all of the following exercises. The main outcome of this tutorial session is to ensure that you can find out the size of a variable (in bytes), dynamically allocate memory for any given datatype, deallocate previously allocated memory and fill allocated memory with data.

This week's tutorial task is shown in red below.

EXERCISE 1: HOW BIG?

Difficult Level: ★ **Duration: 20mins**

Write a program to output the size of the following variables (in bytes):

- char v
- short w
- int x
- double y
- float z
- char str[] = "Hello World"
- int *intPtr
- char **chrPtr

EXERCISE 2: HOW MUCH MEMORY TO YOU WANT?

Difficult Level: ★★ **Duration: 40mins**

Write a program that asks the user what type of data they wish to allocate (i.e. int, char or double) and how many items are required. Use `malloc()` to allocate a block memory large enough for the user's data. Output the start address of the allocated block of memory. Fill the memory with 0s using `memset()`. Finally, ensure the memory is deallocated before exiting the program.

EXERCISE 3: WRECKED ANGLE

Difficult Level: ★★★ **Duration: 1hr**

Write a program to ask the user for a width and height value. You should then use these values to dynamically allocate a two-dimensional array of the given size. Once created the array should be filled with values from 1 to (width*height) beginning in the top left corner of the array (as shown below for an array with a width=4 and height=2). Remember you must also deallocate memory correctly before exiting the program.

1	2	3	4
5	6	7	8

Hint: once you have dynamically allocated a two-dimensional array you can use the [ ][ ] operators to access individual cells as you have already learned when using statically allocated two-dimensional arrays.