CPE 325: Embedded Systems Laboratory
Laboratory Assignment #2

Assignment [50 pts]

1. Write a C program that will print the sizes and ranges of common data types char, short int, int, long int, unsigned int, unsigned long int, long long int, unsigned long long int, float, and double. Your program's output should be like the following:

```
-------------------------------------------------------------------------
| Data Type      | Size (in bytes)  | Minimum          | Maximum        |
-------------------------------------------------------------------------
| char           | 1                | 0                | 255            |
| short int      | 2                | -32768           | 32767          |
|(additional data types goes here)                     |                |
-------------------------------------------------------------------------
```

   Note: You should Use definitions given in the limits.h and float.h header files for the ranges of data types.

2. Write a C program that declares and initializes two integer arrays of equal size as shown below. Your program should create two new integer arrays that contain a sum and a dot product of two arrays, respectively. Display the input arrays and the final output.

```
Input Array A: [-1 2 5 3]
Input Array B: [20 -8 4 1]
Sum of the arrays: [19 -6 9 4]
Dot Product of the arrays: [-13]
```

   Note: Sample Calculation for Dot Product is shown below
   Array #1: (A_1, A_2, A_3)
   Array #2: (B_1, B_2, B_3)
   Dot Product = (A_1 * B_1) + (A_2 * B_2) + (A_3 * B_3)

Topics for Theory

1. Different data types.
2. Size limit of integer data types (char, short, int, long, long long)
3. Endianess

Deliverables

1. Lab report which includes:
   a. Output screenshots (& inputs used)
   b. Flowchart for part 2
   c. Answers to the questions from the tutorial if any
2. Source files (.c or .cpp files)

Note:

1. During demonstration, you are expected to remember the size of basic data types and should be able to calculate the range of the data type for a given size.