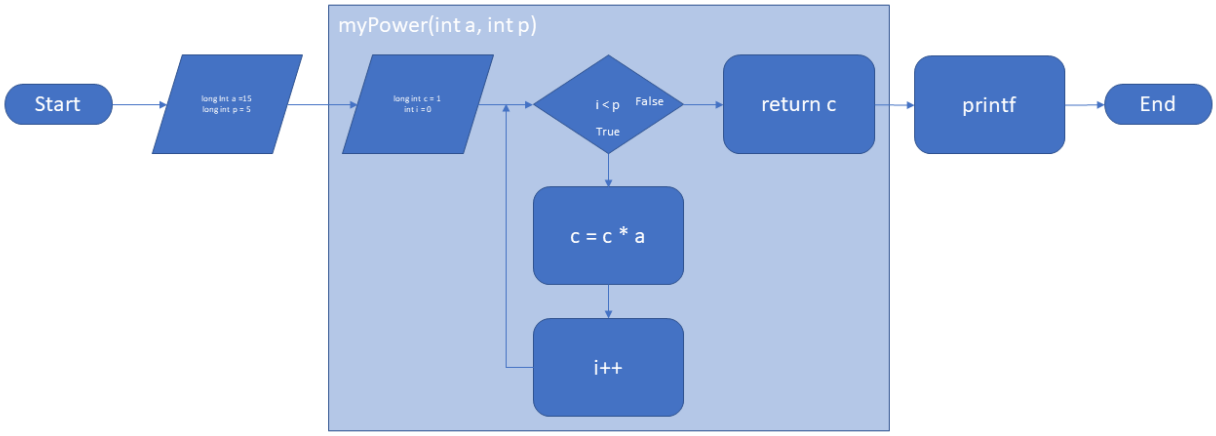
Austin Bumbalough
CPE 325-08
Lab 1
8/27/19

Lab 1

Part 1

Flow Diagram



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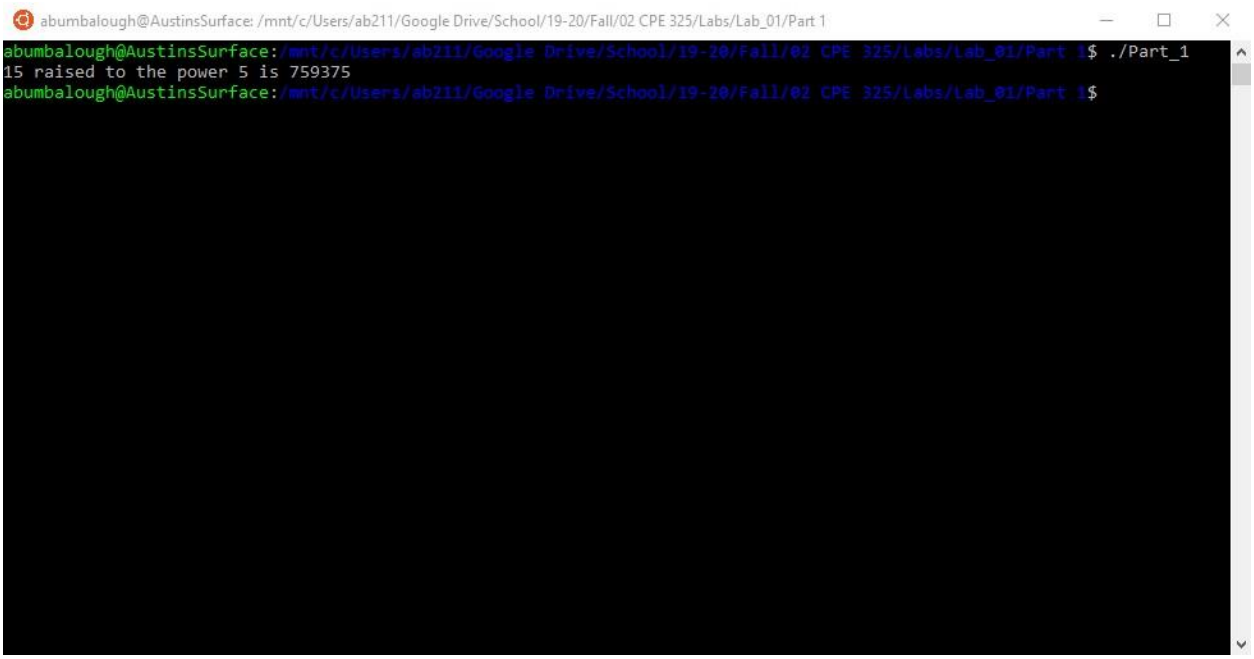
Output



Source Code

```
#include <msp430.h>
#include <stdio.h>

/*
-------------------------------------------------------------
*
File
: Lab_01_Part_01/main.c
*
Description
: Create user-defined power function.
*
Input: Constant values defined in program
* Output: Stdout
*
Author: Austin Bumbalough
* Lab Section: 08
*
Date: 8/27/19
*
-------------------------------------------------------------
*/

long int myPower(int, int) ;

int main(void)
{
```

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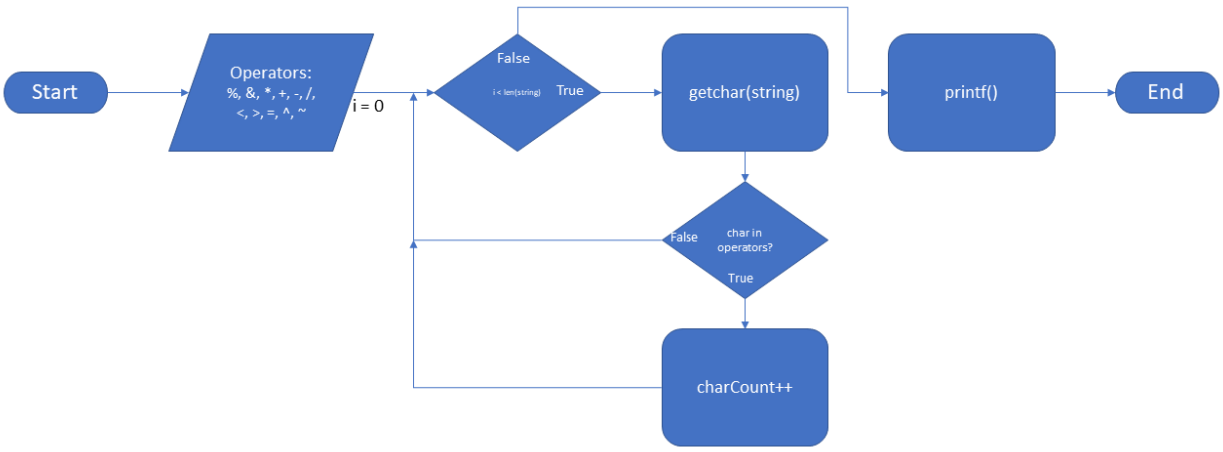
```
    WDTCTL = WDTPW | WDTHOLD;    // stop watchdog timer

    // Declare parameter values
    int a = 2;
    int p = 11;
    long int c;

    c = myPower(a,p);

    printf("%d raised to the power %d is %ld\n", a, p ,c);

    return 0;
}

long int myPower(int a, int b) {
    long int c = 1;

    // c = 1 for case where b = 0
    // for all other cases, c = a^b
    for (int i=0; i<b; i++) {
        c *= a;
    }

    return c;
}
```

Part 2

Flow Diagram



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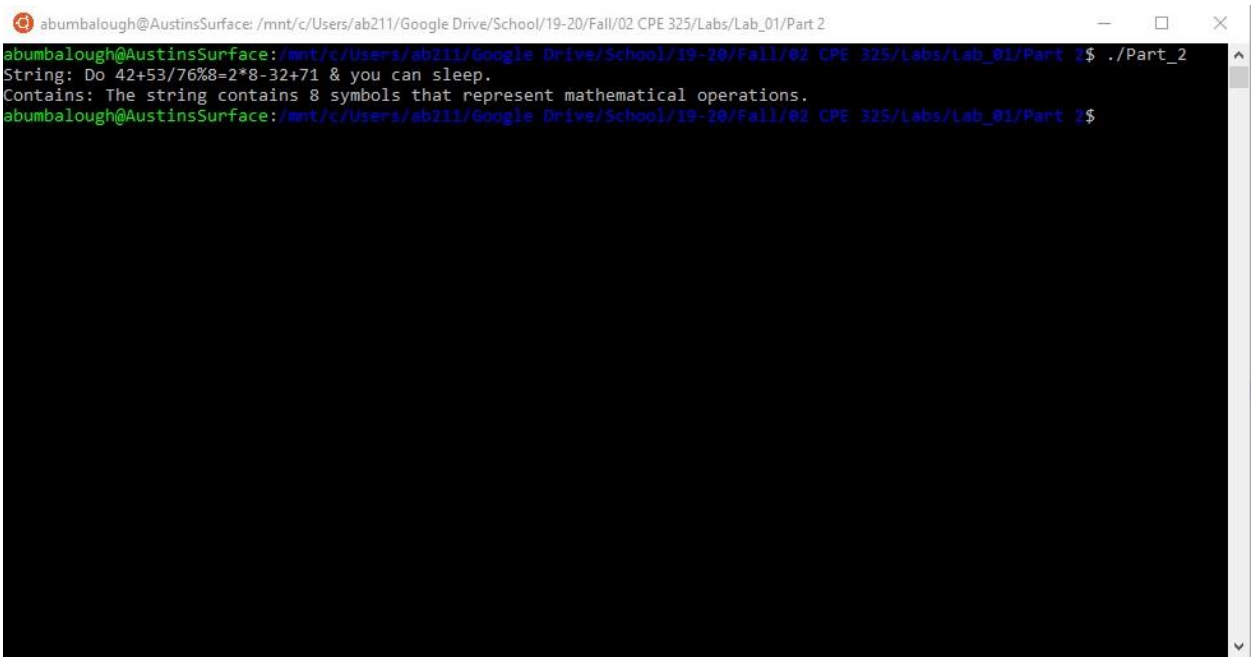
Output



Source Code

```
#include <msp430.h>
#include <stdio.h>


/*
-------------------------------------------------------------
*
File
: Lab_01_Part_02/main.c
*
Description
: Search for math operators in a string.
*
Input: Constant values defined in program
* Output: Stdout
*
Author: Austin Bumbalough
* Lab Section: 08
*
Date: 8/27/19
*
-------------------------------------------------------------
*/
```

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```
int main(void)
{
    WDTCTL = WDTPW | WDTHOLD;   // stop watchdog timer

    // Define array of tokens to compare string against
    char operators[11] = {'%', '&', '*', '+', '-', '/', '<', '>', '=', '^',
'~'};
    char testString[] = "Do 42+53$$76%8=2*8-32+71 & you can sleep.";

    // Declare variable to hold size of arrays for iteration boundary
    size_t opSize = sizeof(operators);
    size_t stringSize = sizeof(testString);

    // Initial counter variable
    int mathCharCount = 0;

    char currentChar;
    for (int i=0;i<stringSize;i++) {

        // Get character from string
        currentChar = testString[i];

        for (int j=0;j<opSize;j++) {

                // Compare current character to token
                if (currentChar == operators[j]) {
                    // Increment counter if match is found
                    mathCharCount++;
                }

                // Repeat for all tokens
            }

    // Repeat for all characters in string
    }

    printf("String: %s\n", testString);
    printf("Contains: The string contains %d symbols that represent
mathematical operations.\n", mathCharCount);

    return 0;
}
```