SE185: Problem Solving in Software Engineering
Quiz # 10 (150 points)

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Answer the following questions and make a pdf file that includes the **source code, sample inputs, and outputs**. You must submit the **pdf file and all of the .c files** on Canvas for full credit. Do not forget to add your group partner name on the pdf file and the source codes.

1. **(50 points)** Write a complete C program that writes the following numbers to a file called "**numbers.txt**".

   12 7 3 0 28 74 37 299

- Then have your program read the file and store the even numbers into an **array** called **evenNums**. The array's memory does not need to be dynamically allocated.
- Lastly, print out the array of even numbers separated by spaces.
- Your program must use **fopen()** and **fclose()** at least once and check **if your file is successfully opened** each time you use **fopen()**. [**fprintf, fscanf,** and **feof** may be useful functions]. You may begin with the following variable declarations:

```
FILE *fp = fopen("numbers.txt" , "w");
int *evenNums = malloc(8 * sizeof(int)); // or int evenNums[8];
int curr;
int count = 0;
int i = 0;
```

Hint: In order to read the file contents, the file needs to be closed after being in writing mode ("w"), then reopened in reading mode ("r"). Reading and writing mode ("r+") can also be used, but the file must exist beforehand.

Inputs and outputs format:

```
12 0 28 74
```

```
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz10
$ gcc question1.c -o question1

jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz10
$ ./question1
12 0 28 74
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz10
$
```

2. (50 points) Write a complete C program which includes a recursive function to calculate the power of a number (e.g., x^n) given by the user. (like the pow() function in the math.h library).

Inputs and outputs format:

```
Enter number to power: 2 to 3
2 to the power 3 = 8
```

```
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz10
$ ./question2
Enter number to power: (Ex. 2 to 3) 2 to 3
2 to the power of 3 = 8
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz10
$ ./question2
Enter number to power: (Ex. 2 to 3) 3 to 3
3 to the power of 3 = 27
```

3. (50 points) Write a complete C program which includes a recursive function to calculate the length of any string given by the user. (like the strlen() function in the math.h library).

Inputs and outputs format:

```
Enter a string: calculate the length of a string
The length of "calculate" = 9
```

```
jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz10
$ gcc question3.c -o question3

jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz10
$ ./question3
Enter the string: calculate
The length of calculate = 9

jesus@ASUS_GA503 /cygdrive/c/fall2022/se185/quiz10
$ ./question3
Enter the string: se185
The length of se185 = 5
```