Homework 3 Due:11/12/2022

Q1   [40p] Design a calculator that can only add and substract numbers. The input is entered as one-line text and the input is decomposed into its operands and operations, the result is calculated and returned. The function prototype is `int calculator(char*);`.

Q2

$$I = \int_0^{\pi/2} sin(x)dx$$

- [15p] Implement the function `float integrate_simpson(float,float);` using the Simpson's Rule.

- [15p] Implement the function `float integrate_numeric(float,float);` using the numeric integration.

Q3   [30p] Implement the function `void grade();` which reads a file `input.txt` and writes a file `output.txt`. The files are given below. The input file contains comma seperated midterm and final exam grades. 40% midterm plus 60% final gives the average grade. The grade is converted into their letter representation using the table below.

- $00 \leq grade \leq 29$ FF

- $30 \leq grade \leq 41$ DD

- $42 \leq grade \leq 53$ DC

- $54 \leq grade \leq 64$ CC

- $65 \leq grade \leq 76$ CB

- $77 \leq grade \leq 87$ BB

- $88 \leq grade \leq 93$ BA

- $94 \leq grade \leq 100$ AA

```
20,60
10,50
100,40
40,40
50,90
80,50
```

<div align="center">deliverables/input.txt</div>

```
20.00,60.00|44.00|DC
10.00,50.00|34.00|DD
100.00,40.00|64.00|CC
40.00,40.00|40.00|DD
50.00,90.00|74.00|CB
```

```
80.00,50.00|62.00|CC
-----------------------------------
60.00,66.00|63.60|
```

<div align="center">deliverables/output.txt</div>

- Submit a single `*.c` file to NINOVA. Other file types will not be accepted nor graded.

- The given main function is not going to be submitted, only the necessary implementation needs to be submitted.

- Your submission will be compiled with a tester `main.c` file. Your code needs to compile without error, or your grade will be zero.

- Each functionality will be tested and added to your grade.

- Late submissions will be deduced $10p$ for each day late.

- Cheating is not allowed, once cheating is detected all involved submissions will be graded zero.

```c
// DO NOT UPLOAD THIS FILE
#include <stdio.h>
#include <math.h>

// Q1
int calculator(char*);

// Q2
float integrate_simpson(float a,float b);
float integrate_numeric(float a,float b);

// Q3
void grade();

int main()
{
    char input[255]={0};
    scanf("%s",&input);

    int res=calculator((char*)&input);
    printf("=%d\n",res);
    return 0;
}
```

<center>deliverables/main.c</center>

```c
// ONLY UPLOAD THIS FILE
#include <stdio.h>
#include <math.h>

int calculator(char*)
{
    //implementation goes here
}

float integrate_simpson(float a,float b)
{
    //implementation goes here
}

float integrate_numeric(float a,float b)
{
    //implementation goes here
}

void grade()
{
    //implementation goes here
```

```
}
```

deliverables/student.c