North South University

Department of Computer Science and Engineering

Course Title: CSE115, Final Exam, FULL POINTS: 50

Instruction: Answer the questions as directed. You must number your questions properly. You need to provide .c files. Complete all your work, put all your files in a folder, zip it and upload. You will be able to make only one submission at the end of the exam. Plagiarism of any kind is highly discouraged.

1. Write a full code that will contain all the following measures. (3+3+5+5=16 points)
Suppose, you are running a book shop. You have 60 books there.

a) Design a structure name ***Book_info*** to store all the books' *Name, Id, publish year, present price* and any other thing that is needed. Take all the data for all the books from user.

b) Suppose, you have to change some books price. Write a function to calculate the price change**.** If a book has been published before the year 2010, its price will reduce by 25%. All other books price will be increased by 10%.

c) Print the names of all the books and their new price.

d) Open a text file name **Shop_Database**. If the file opens successfully, write all the books name and their new price on that file.

2) Write a program using recursion that computes the sum of the series: (7 points)

$1^2 + 5^2 + 6^2 + 11^2 + 17^2 + 28^2 + \ldots \ldots + n^2$ (n is an input)

3) Take a string as an input from the user where user will provide all lowercase letters. (7 points)
Now write a program that will convert all the starting letters of the words from lowercase to uppercase. Print the modified string. Do not use any library function.
Example: Input String: dhaka is a capital city
Modified /Output String: Dhaka Is A Capital City

4) Write the output: (5 points)

```
#include<stdio.h>
int main()
{
```

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```
int a=10,b=25,*p1=&a,*p2=&b;
char str[20]="freedom";
*p1=b+a;
printf("%d %d %d %d",a,b,*p1,*p2);
p2=p1;
printf("\n%d %d %d %d",a,b,*p1,*p2);
*p2=b-a;
printf("\n%d %d %d %d",a,b,p1,p2);
p1=str;
printf("\n%s %c %s",p1,str[4],str);
}
```

5 a) Declare an array of size 20 and take input in an integer array from users using a loop.(4 points)
5 b) Find the highest number from the array you declared in question 5 (a). (4 points)
5 c) This question is about 2D array. Write the two required functions. Insert code where necessary in main() (7points)

```
#include <stdio.h>
#define STUDENTS 3
#define EXAMS 4
/* function prototypes */
double average( const int setOfGrades[], int tests );
void printArray( const int grades[][ EXAMS ], int pupils, int tests );

int main( void ){
 int student;
const int studentGrades[ STUDENTS ][ EXAMS ] =
        { { 77, 68, 86, 73 }, { 96, 87, 89, 78 }, { 70, 90, 86, 81 } };

/* output array studentGrades */
printf( "The array is:\n" );


 /* calculate average grade for each student */
 for ( student = 0; student < STUDENTS; student++ ) {
 printf( "The average grade for student %d is %.2f\n",                    );


 } /* end for */
```

return 0; } /* end main *

OR

5c) Write a function which can check whether a number is a prime number or not. (7 points)
Function prototype is: **int prime(int a);**
Using this function, in the main function print all the prime numbers that are from 200 to 500.
Also find out how many prime numbers are in that range.