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CSE 115, Programming Language I
Final Exam, Summer 2020
Total 40

1. (5 Points) Write a recursive function to calculate the summation 1+2+3+...+n.

```
#include <stdio.h>
int nsum (int n)
{
   if (n==0)
   return 0;
   else
   return (n + nsum(n-1));
}
int main ()
{
int n, sum;
printf ("Finding out the summation of 1+2+3+...+n \n");
printf ("Enter n:");
scanf ("%d", &n);
sum = nsum(n);
printf("Sum= %d", sum);

return 0;
}
```

2. (7 points) Write C program to insert 35 at index 3 of the array {23, 12, 19, 12, -1}. The resultant array will be {23, 12, 19, 35, 12, -1}.

```
#include <stdio.h>
int main ()
{
   int arr[10] = {23, 12, 19, 12, -1};
   int i, n;
   for (i=5; i>=4; i--)
   {  arr[i] = arr[i-1];
   }
   printf("Insert 35 at index 3 of the arr \n\n");
   scanf ("%d",&n);
   printf ("\n\n");
   arr[3] = n;
   printf ("The resultant array is: {\t");
   for (i=0; i<=5; i++)
   { printf("%d, \t", arr[i]);
   }
   printf ("}");
   return 0;
}
```

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3. (7) Write a C code segment to replace all the negative elements in 3x3 2D array with 0. An example

$$\begin{bmatrix} 12 & -3 & 23 \\ -5 & 4 & 2 \\ 11 & -7 & 5 \end{bmatrix} \text{ will be } \begin{bmatrix} 12 & 0 & 23 \\ 0 & 4 & 2 \\ 11 & 0 & 5 \end{bmatrix}$$

```
#include<stdio.h>
int main()
{
  int arr[3][3], i, j;
  for(i=0; i<3; i++)
  {
    for(j=0; j<3; j++)
    {
      printf("Mat %d %d:", i+1, j+1);
      scanf("%d", &arr[i][j]);
    }
  }
  printf("\n\nThe Matrix is:\n\n");
  for(i=0; i<3; i++)
  {
    for(j=0; i<3; j++
      {
        printf("%d\t", arr[i][j]);
      }
    printf("\n\n\n");
  }
  printf("\n\nResult:\n\n");
  for(i=0; i<3; i++)
  {
    for(j=0; j<3; j++)
    {
      if(arr[i][j]<0)
        arr[i][j]=0;
      printf("%d"\t", arr[i][j]);
    }
    printf("\n\n\n");
  }
  return 0;
}
```

4. (7 points) Write a function void toLowercase(char *s) that converts all the uppercase letters of the string s into lowercase letters.

```
#include<stdio.h>
#include<string.h>
void toLowercase(char *s)
{
  int i;
  for(i=0; i<=strlen(s); i++)
  {
    if((s[i]>=65)&&(s[i]<=92))
    {
      s[i]=s[i]+32;
    }
  }
  puts(s);
}
```

```
int main(void)
{
  char string[100];
  printf("Enter a string: ");
  gets(string);
  printf("\n\nLowercase
                letters: ");
  toLowercase(string);
  return 0;
}
```

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5. (7 points) Define a structure that contains the attributes of a Vehicle (for example: color, model_name, model year, etc.). Write codes to take input from user for all the fields in the structure and display the fields

```
#include<stdio.h>
struct vehicle
{
   char company[50], country[50];
   char color[50], model_name[50];
   int model_year, mileage, price;
};
int main()
{
    struct vehicle vehicle;
    printf("Enter the COMPANY of the vehicle: ");
    gets(vehicle.company);
    printf("\nEnter the MODEL NAME of the vehicle: ");
    gets(vehicle.model_name);
    printf("\n Enter the COUNTRY of ORIGIN: ");
    gets(vehicle.country);
    printf("\n Enter the COLOR: ");
    gets(vehicle.color);
    printf("\n Enter the MODEL YEAR: ");
    scanf("%d", &vehicle.model_year);
    printf("\n Enter the MILEAGE: ");
    scanf("%d", &vehicle.mileage);
    printf("\n Enter the PRICE: ");
    scanf("%d", &vehicle.price);
    printf("\n\n\n Company of the vehicle is: %s\n\n", vehicle.company);
    printf("Model Name of the vehicle is: %s\n\n", vehicle.model_name);
    printf("Country of origin: %s\n\n", vehicle.country);
    printf("Color: %s\n\n", vehicle.color);
    printf("Model year: %d\n\n", vehicle.mode_year);
    printf("Mileage: %d KM\n\n", vehicle.mileage);
    printf("Price: %d BDT\n\n", vehicle.price);
    return 0;
}
```

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6.(7points) Write a program that opens a file called "input.txt", reads one line of string from it, and then adds the string to the content of another file called "output.txt" at the end.

```
#include <stdio.h>
int main()
{
    FILE *fileA, *fileB;
    char str[1000];

    fileA=fopen("input.txt", "r");
    fileB=fopen("output.txt", "a");
    if((fileA!=NULL) && (fileB!=NULL))
     {    printf("File found. Press ENTER to add the line in
                                        'output.txt' file \n\n\n");

          fgets(str, 1000, fileA);
          fprintf(fileB, "%s", str);
     }
     else
     {
         printf("File not found");
     }
     fclose(fileA);
     fclose(fileB);
     return 0;
}
```