Samaa Hany Seif Elyazal , Wireless Communication, Intake 42

Problem (1)

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

int main()
{
  char ch;
  printf("Enter any character. \n");
  ch=getch();
  do
  {
     ch=getch();
     if (ch>31 && ch<48)
     {
        printf("The input is a special char \n");
     }
     else if ( ch>47 && ch<58)
     {
        printf("The input is digit \n");
     }
     else if ( ch>64 && ch<91)
     {
        printf("The input is large char \n");
     }
     else if ( ch>96 && ch<123)
     {
        printf("The input is a small char \n");
     }
  } while(ch!=13);
  return 0;
}
```

****

Problem (2)

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

int main()
{
   int num;
   int n;
   int arr[6]= {0};
   float rem;
   int i=0;
```

```
    printf("Enter the number, please!\n\n");
    scanf("%d",&num);
    while (num!=0)
    {
        rem =num%2;
        if (rem!=0)
        {
            arr[i]=1;
        }
        else
        {
            arr[i]=0;
        }
        num=num/2;
        i++;
    }
    n=i;
    printf("The Binary representation of a given number\n \n");
    for ( i=n-1 ; i>=0 ; i--)
    {
        printf("%d ", arr[i]);
    }
        printf("\n \n");

    return 0;
}
```

****

Problem (3)

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

int main()
{
    int num;
    int sum=0;
    int i=0;
    printf("Enter the number, please!\n\n");
    do
    {
        scanf("%d",&num);
        if (num%2==0)
        {
            sum=num+sum;
        }
        else if (num%2!=0)
```

```
    {
      i++;
    }
  } while(i<2);
  printf("Sum= %d \n",sum);
  printf("Bye \n");
    return 0;
  }
```

****

Problem (4) **##Not finished**

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

int main()
{
  int num;
  int i=0;
  printf("Enter the number, please!\n");
  scanf("%d",&num);
  if (num<0)
  {
    printf("Enter a positive number, please! \n");
    scanf("%d",&num);
  }
  do
  {
    if (num%2==0)
    {
      if ( num==2)
      {
        printf("The number is a base of 2!\n\n");
        num=num/2;
      }
      else
      {
        num=num/2;
        printf("The number is not a base of 2!\n\n");
      }
    }
    else if (num%2!=0)
    {
      printf("The number is not a base of 2!\n\n");
    }
  }
  while(num%2==0);
```

```
   return 0;
}
```

****

Problem (5)

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

int main()
{
   int num;
   int res1, res2;
   printf("Enter the number \n");
   scanf("%d",&num);
   res1=Set_Bits(num);
   res2=NumOf_Bits(num);
   printf("Set of bits is = %d  and Number of bits is =  %d\n",res1,res2);
   return 0;
}

int Set_Bits(int num)
{
   int bit=0;
   while(num!=0)
   {
      if (num%2!=0)
      {
         bit=bit+1;
      }
      num=num/2;
   }
   return bit;
}
```

****

Problem (6)

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

int main()
{
   int num;
   int n;
   int arr[6]= {0};
   float rem;
   int i=0;
```

```
    int j;
    printf("Enter the number, please!\n");
    scanf("%d",&num);
    while (num!=0)
    {
        rem =num%2;
        if (rem!=0)
        {
            arr[i]=1;
        }
        else
        {
            arr[i]=0;
        }
        num=num/2;
        i++;
    }
    n=i;
    for ( i=n-1 ; i>=0 ; i--)
    {
        printf("%d ", arr[i]);
    }
    printf("\n \n");
    printf("which bit you want to replace/ toggle?\n");
    scanf("%d",&j);
    if(arr[j]==0)
        arr[j]=1;
    else if(arr[j]==1)
        arr[j]=0;

    for ( i=0 ; i<n ; i++)
    {
        printf("%d ", arr[i]);
    }

    return 0;
}
```

****

Problem (7)

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

int main()
{

int num, rem, Sum=0;
```

```
  printf("Enter any number, please! \n");
  scanf("%d", &num);

  while(num > 0)
  {
     rem = num % 10;
     Sum = Sum+ rem;
     num = num / 10;
  }
printf("\n");
  printf("Sum of the digits of Given Number = %d \n", Sum);

    return 0;
}
```

****

Problem (8)

```
int main()
{
    int num;
    int res1, res2;
    printf("Enter the number \n");
    scanf("%d",&num);
    res1=Set_Bits(num);
    res2=NumOf_Bits(num);
    printf("Set of bits is = %d  and Number of bits is =  %d\n",res1,res2);
    return 0;
}

int NumOf_Bits(int num)
{
    int bit=0;
    while(num!=0)
    {
        if (num%2!=0 || num%2==0)
        {
            bit=bit+1;
        }
        num=num/2;
    }
    return bit;
}
```

****

Problem (9)

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

```
#include <stdlib.h>

typedef unsigned long long ull;
short Max_Zeros_Bet_Ones(ull Num, short Left, short Right);
unsigned char Get_No_Of_Bits(ull Num);
int main()
{
   ull Num;
   while(1){
      printf("Enter Your Number...\n>> ");
      scanf("%I64u", &Num);
   }

   return 0;
}
short Max_Zeros_Bet_Ones(ull Num, short Left, short Right){
   short Max = -1;
   ull x;
   if(Left < Right){
      x = (1 << Left) | (1 << Right);
   }
   return Max;
}
unsigned char Get_No_Of_Bits(ull Num){
   unsigned char Bits = 0;
   while(Num){
      Bits++;
      Num >>= 1;
   }
   return Bits;
}
```

****

Problem (10)

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

int main()
{
   int num1, num2, sum;
   printf("Enter the two numbers, please!\n");
   scanf("%d", &num1);
   scanf("%d", &num2);
   printf("The sum of numbers between %d and %d  is  %d\n", num1, num2,
Sum_Bet(num1,num2));
   return 0;}
```

```
int Sum_Bet(int x, int y)
{
   int sum=0;
   int j=x-y;
   for (int i=1; i<j ; i++)
   {
      sum= sum+y+i;
   }
   return sum;
}
```

****

Problem (11) **##Need modifications**

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

int main()
{
   int num1, num2;
   printf("Enter the two numbers, please!\n");
   scanf("%d", &num1);
   scanf("%d", &num2);
   int arr[10];
   printf("The array is: \n");
   if (num1>num2)
   {
      int j=num1-num2;
      for (int i=1; i<j ; i++)
      {
         arr[i]=num2+i;
         printf("%d \t",arr[i]);
      }
   }
   if (num1<num2)
   {
      int j=num2-num1;
      for (int i=1; i<j ; i++)
      {
         arr[i]=num1+i;
         printf("%d \t",arr[i]);
      }
   }
  // printf("%d", Num_Bet(num1,num2));
   printf("\n");
   return 0;}
```

```
void Num_Bet(int num1, int num2)
{
   int arr[10];
   if (num1>num2)
   {
      int j=num1-num2;
      for (int i=1; i<j ; i++)
      {
         arr[i]=num2+i;
         printf("%d \t",arr[i]);
      }
   }
   if (num1<num2)
   {
      int j=num2-num1;
      for (int i=1; i<j ; i++)
      {
         arr[i]=num1+i;
         printf("%d \t",arr[i]);
      }
   }
}
```

****

Problem (12)

```
#ifndef COMMON_MACROS
#define COMMON_MACROS
#define SET_BIT(REG,BIT) (REG|=(1<<BIT))
#define CLEAR_BIT(REG,BIT) (REG&=(~(1<<BIT)))
#define TOGGLE_BIT(REG,BIT) (REG^=(1<<BIT))
#define ROR(REG,num) ( REG= (REG>>num) | (REG<<(8-num)) )
#define ROL(REG,num) ( REG= (REG<<num) | (REG>>(8-num)) )
#define BIT_IS_SET(REG,BIT) ( REG & (1<<BIT) )
#define BIT_IS_CLEAR(REG,BIT) ( !(REG & (1<<BIT)) )

#endif
```

****

Problem (13)

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

int main()
{
```

```
int arr_a[3][3]= {0};
int arr_b[3][1]={0};
int arr_c[3][1]={0};
printf("Enter the first array elements, please!\n");
for (int i=0; i<3; i++)
{
    for (int j=0; j<3; j++)
    {
        scanf("%d",&arr_a[i][j]);
    }
}
printf("\n");
printf("Enter the second array elements, please!\n");
for (int i=0; i<3; i++)
{
    for (int j=0; j<1; j++)
    {
        scanf("%d",&arr_b[i][j]);
    }
}
printf("\n");
printf("First array: \n");
for (int i=0; i<3; i++)
{
    for (int j=0; j<3; j++)
    {
        printf("%d \t",arr_a[i][j]);
    }
    printf("\n");
}
 printf("\n");
printf("Second array: \n");
for (int i=0; i<3; i++)
{
    for (int j=0; j<1; j++)
    {
        printf("%d \t",arr_b[i][j]);
    }
    printf("\n");
}
 printf("\n");
for (int i=0; i<3; i++)
{
    for (int j=0; j<3; j++)
    {
        arr_c[i][0]+=arr_a[i][j]*arr_b[j][0];
```

```
        }
        printf("\n");
    }
    printf("The result of multiplication is: \n");
    for (int i=0; i<3; i++)
    {
        for (int j=0; j<1; j++)
        {
            printf("%d \t",arr_c[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

****

Problem (14)

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

int main()
{
    char fname [10];
    char lname [10];
    char fullname [20];
    printf("Please Enter your first name \n");
    gets(fname);
    printf("Please Enter your second name \n");
    gets(lname);

    Full_Name(fname,lname);
    return 0;
}
void Full_Name(char x[10],char y[10])
{
    char z [20];

    strcpy(z,x);
    strcat (z," ");
    strcat (z,y);

    printf("Your full name is : \n");
    puts(z);
}
```

****

Problem (15)

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#define SIZE 100

void Remove_RepChar(char fullname[]);
void Display(char* fullname);
int main()
{
   char fullname [SIZE] = {-1};
   gets(fullname);
   Remove_RepChar(fullname);
   Display(fullname);
   return 0;
}
void Remove_RepChar(char fullname[])
{
   for( int i = 0; i < SIZE; i++)
   {
      for( int j= 1 + i; j < SIZE ; j++)
      {
         if(fullname[i] == fullname[j])
         {
            fullname[j] = -1;
         }
      }
   }
}
void Display(char* fullname){
for(int  i= 0; i < SIZE ; i++)
   {
      if(fullname[i] != -1)
      {
         printf("%c", fullname[i]);
      }
   }
}
```

****

Problem (16&19&23)

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
```

```
int main()
{
   char s[1000],c;
   int i,count=0;

   printf("Enter  the string : \n");
   gets(s);
   printf("Enter character to be searched: \n");
   c=getchar();

   for(i=0;s[i];i++)
   {
         if(s[i]==c)
         {
        count++;
                  }
         }

         printf("character '%c' occurs %d times \n ",c,count);


   return 0;
}
```

****

Problem (17)

```
#include <stdio.h>
#define MY_ARRAY_SIZE(ARRAY_ADDRESS) ((char*)(&(ARRAY_ADDRESS) + 1) -
(char*)(&(ARRAY_ADDRESS)))
int main()
{
   char Array_Chars[5];
   short Array_Shors[5];
   int Array_Ints[5];
   long long Array_Long[5];
   printf("Tests are...\n");
   printf("Size = %hu Bytes\nSize = %hu Bytes\nSize = %hu Bytes\nSize = %hu Bytes\n",
MY_ARRAY_SIZE(Array_Chars)
                                          , MY_ARRAY_SIZE(Array_Shors)
                                          , MY_ARRAY_SIZE(Array_Ints)
                                          , MY_ARRAY_SIZE(Array_Long));
   return 0;
}
```

****

Problem (18)

```
#include <stdio.h>
#define MY_SIZE_OF(TYPE) (sizeof(TYPE))
int main()
{
   printf("Size Of Char    is %hu Byte\n", MY_SIZE_OF(char));
   printf("Size Of Short   is %hu Bytes\n", MY_SIZE_OF(short));
   printf("Size Of Int     is %hu Bytes\n", MY_SIZE_OF(int));
   printf("Size Of Long    is %hu Bytes\n", MY_SIZE_OF(long long));
   return 0;
}
```

****

Problem (20)

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

int main()
{
   char name[10]={'\0'};
   printf("Enter your name \n");
   gets(name);
   for(int i =sizeof(name)-1; i>=0; i--)
   {
      printf("%c",name[i]);
   }
   return 0;
}
```

****

Problem (21)

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

int main()
{
   int arr[3][3];
   int ar[9]={0};
   printf("Enter the first array elements, please!\n");
   for (int i=0; i<3; i++)
   {
      for (int j=0; j<3; j++)
      {
         scanf("%d",&arr[i][j]);
      }
```

```
    }
    printf("\n" );
    int k=0;
    for (int i=0; i<3; i++)
    {
        for (int j=0; j<3; j++)
        {
            ar[k]=arr[i][j];
            k++;
        }
    }
    int m=0;
    for (int i=0 ; i<9 ; i++)
    {
        for (int j=0 ; j<9 ; j++)
        {
            if (ar[i]<ar[j])
            {
                m = ar[i];
                ar[i]=ar[j];
                ar[j]=m;
            }
        }
    }
    printf("\n" );
    printf("The reverse array: " );
    for (int i=0 ; i<9 ; i++)
    {
        if ((i%3)!=0)
            printf("%d \t",ar[i]);
        else
        {
            printf("\n" );
            printf("%d \t",ar[i]);
        }
    }

    return 0;
}
```

****

Problem (24)

```
void swap(int *x,int *y)
{
    int t;
     t   = *x;
    *x   = *y;
```

```
   *y   =  t;
}

int main()
{
   int num1,num2;

   printf("Enter value of num1: ");
   scanf("%d",&num1);
   printf("Enter value of num2: ");
   scanf("%d",&num2);

   //displaying numbers before swapping
   printf("Before Swapping: num1 is: %d, num2 is: %d\n",num1,num2);

   //calling the user defined function swap()
   swap(&num1,&num2);

   //displaying numbers after swapping
   printf("After  Swapping: num1 is: %d, num2 is: %d\n",num1,num2);

   return 0;
}
```