**Institute of Engineering & Management**

**Department of Computer Science & Engineering**

**Data Structure Laboratory for 2nd year 3rd semester 2017**

**Code: CS 392**

**Date:** 26/7/17

**ASSIGNMENT-1**

**Problem-1(a)**

**Problem Statement**: Program to find the number of elements in an array (Don’t ask user to enter the size)

**Source code:** #include <stdio.h>  
void main()  
{  
 int arr[]={1,2,3,4,5,6,7,8,9};  
 printf(“The size of the array is ”);  
 printf("%d\n",sizeof(arr)/sizeof(int));  
}

**Output:** The size of the array is 9

**Problem-1(b)**

**Problem Statement:** Print the alternative elements in an array.

**Source code:** #include <stdio.h>  
void main()  
{  
 int i,arr[]={0,1,2,3,4,5,6,7,8,9};  
 printf("Every alternate elements are ");  
 for(i=0;i<9;i=i+2)  
 {  
 printf("%d, ",arr[i]);  
 }  
}

**Output:** Every alternate elements are 0, 2, 4, 6, 8,

**Problem-1(c)**

**Problem Statement:** Increment every Element of the array by one & print incremented array (pass the whole array through a function and make necessary changes within the function body itself)

**Source code:** #include <stdio.h>  
  
void incr(int \*, int);  
  
void main()  
{  
 int i,arr[]={0,1,2,3,4,5,6,7,8};  
 incr(arr, sizeof(arr)/sizeof(int));  
}  
  
void incr(int \*arr, int len)  
{  
 int i;  
 printf("The incremented values are ");  
 for(i=0;i<len;i++)  
 {  
 printf("%d, ",++\*(arr+i));  
 }  
}

**Output:** The incremented values are 1, 2, 3, 4, 5, 6, 7, 8, 9,

**Problem-1(d)**

**Problem Statement:** Display all of the non repeated elements in an array.

**Source code:** #include <stdio.h>  
  
void main()  
{  
 int i, j, temp, arr[]={1,2,3,2,4,5,1,5,3},  
 len=sizeof(arr)/sizeof(int);  
 for(i=0;i<len-1;i++)  
 {  
 for(j=0;j<len-i-1;j++)  
 {  
 if(arr[j]>=arr[j+1])  
 {  
 temp=arr[j];  
 arr[j]=arr[j+1];  
 arr[j+1]=temp;  
 }  
 }  
 }  
 printf("the non-repeated elements are %d, ",arr[0]);  
 for(i=1,temp=arr[0];i<len;i++)  
 {  
 if(arr[i-1]==arr[i])  
 continue;  
 else printf("%d, ",arr[i]);  
 }  
}

**Output:** the non-repeated elements are 1, 2, 3, 4, 5,

**Problem-1(e)**

**Problem Statement:** Segregate 0s on left side & 1s on right side of the array (traverse array only once)

**Source code:** #include <stdio.h>  
  
void main()  
{  
 int i, count0=0, arr[]={1,0,1,1,1,0,0,1,0,0};  
 for(i=0;i<sizeof(arr)/sizeof(int);i++)  
 {  
 if(arr[i]==0)  
 count0++;  
 }  
 printf("The modified array is ");  
 for(i=0;i<sizeof(arr)/sizeof(int);i++,count0--)  
 {  
 if(count0>0)  
 arr[i]=0;  
 else arr[i]=1;  
 printf("%d, ",arr[i]);  
 }  
 printf("\n");  
}

**Output:** The modified array is 0, 0, 0, 0, 0, 1, 1, 1, 1, 1,

**Problem-1(f)**

**Problem Statement:** Pass the middle value of the array to a function to modify it by adding 10 with it

**Source code:** #include <stdio.h>  
  
void modify(int \*ptr)  
{  
 \*ptr+=10;  
}  
  
void main()  
{  
 int i, arr[]={1,2,3,4,5,6,7,8,9},  
 size=sizeof(arr)/sizeof(int);  
 printf("Before modifying ");  
 for(i=0;i<size;i++)  
 printf("%d, ",arr[i]);  
 printf("\n");  
 modify(arr-1+(size+1)/2);  
 printf("After modifying ");  
 for(i=0;i<size;i++)  
 printf("%d, ",arr[i]);  
 printf("\n");  
}

**Output:** Before modifying 1, 2, 3, 4, 5, 6, 7, 8, 9,  
After modifying 1, 2, 3, 4, 15, 6, 7, 8, 9,

**Problem-1(g)**

**Problem Statement:** Sort the above array using bubble sort logic and print it.

**Source code:** #include <stdio.h>  
void main()  
{  
 int i, j, temp, arr[]={1,2,3,2,4,5,1,5,3}, len=sizeof(arr)/sizeof(int);  
 for(i=0;i<len-1;i++)  
 {  
 for(j=0;j<len-i-1;j++)  
 {  
 if(arr[j]>=arr[j+1])  
 {  
 temp=arr[j];  
 arr[j]=arr[j+1];  
 arr[j+1]=temp;  
 }  
 }  
 }  
 printf("The sorted array is ");  
 for(i=0;i<len;i++){  
 printf("%d, ",arr[i]);  
 }  
}

**Output:** The sorted array is 1, 1, 2, 2, 3, 3, 4, 5, 5,

**Problem-2**

**Problem Statement:** Programe to read, display, add & substract two distances. Distance must be defined using kms & meters. (Using a structure, two functions)

**Source code:** #include <stdio.h>  
  
typedef struct dts  
{  
 int kms, mts;  
} distance;  
  
void substract(distance \*dist)  
  
{  
 if(dist[0].mts>=dist[1].mts)  
 {  
 dist[0].kms=dist[0].kms-dist[1].kms;  
 dist[0].mts=(dist[0].mts-dist[1].mts)%1000;  
 }  
 if(dist[0].mts<dist[1].mts)  
 {  
 dist[0].kms=dist[0].kms-dist[1].kms-1;  
 dist[0].mts=(dist[0].mts-dist[1].mts+1000)%1000;  
 }  
 printf("The result is %dkm %dmts\n", dist[0].kms, dist[0].mts);  
}  
  
void add(distance \*dist)  
{  
 dist[0].kms=dist[0].kms+dist[1].kms + (dist[0].mts+dist[1].mts)/1000;  
 dist[0].mts=(dist[0].mts+dist[1].mts)%1000;  
 printf("The result is %dkm %dmts\n", dist[0].kms, dist[0].mts );  
}  
  
void main()  
{  
 char c;  
 distance dist[2];  
 printf("Enter the 1st distance in kms and metres \n");  
 scanf("%d %d",&dist[0].kms,&dist[0].mts);  
 printf("Enter the 2st distance in kms and metres \n");  
 scanf("%d %d",&dist[1].kms,&dist[1].mts);  
 printf("Enter '+' to add and '-' to substract\n");  
 fflush(stdin);  
 scanf("%c",&c);  
 switch(c)  
 {  
 case '+': add(dist); break;  
 case '-': substract(dist); break;  
 default : printf("wrong symbol\n");  
 }  
}

**Input/Output:** Enter the 1st distance in kms and metres  
55  
100  
Enter the 1st distance in kms and metres  
45  
500  
Enter ‘+’ to add and ‘-’ to substract  
-  
The result is 9kms 600mts

**Problem-3**

**Problem statement:** A program to enter a character & determine whether it is vowel or not using switch case statement.

**Source code:**#include <stdio.h>  
  
void main()  
{  
 char c;  
 printf("Enter a character\n");  
 c=getchar();  
 switch(c)  
 {  
 case 'a': printf("This is a vowel\n"); break;  
 case 'e': printf("This is a vowel\n"); break;  
 case 'i': printf("This is a vowel\n"); break;  
 case 'o': printf("This is a vowel\n"); break;  
 case 'u': printf("This is a vowel\n"); break;  
 default : printf("This is not a vowel\n");  
 }  
}

**Input/Output:** Enter a character  
a  
This is a vowel

**Problem-4**

**Problem Statement:** Implement Binary Search.

**Source code:** #include <stdio.h>  
  
int n, flag=0;  
void search(int \*a, int max)  
{  
 if(n==a[max/2])  
 { flag++; return; }  
 else if(max==0)  
 return;  
 else if(n>a[max/2])  
 search( (a+(max/2)+1), (max-1)/2 );  
 else if(n<a[max/2])  
 search( a, (max-1)/2 );  
}  
void main()  
{  
 int a[]={1,2,4,7,9,11,15,18,19,20};  
 printf("Enter the number\n");  
 scanf("%d", &n);  
 search( a, (sizeof(a)/sizeof(int))-1 );  
 if(flag==1)  
 printf("search result: found\n");  
 else printf("search result: not found\n");  
}

**Input/Output:** Enter the number  
19  
search result: found

**Problem-5**

**Problem Statement:** A program to read a text, delete, all the semicolons it has & finally replace all ‘,’ with ‘.’

**Source code:** #include <stdio.h>  
#include <string.h>  
  
void main()  
{  
 int i, count;  
 char str[100];  
 printf("Enter the text(<100 characters)\n");  
 gets(str);  
 for(i=0,count=0;i<strlen(str);i++)  
 {  
 if(str[i]==';')  
 continue;  
 else if(str[i]==',')  
 {  
 str[count]='.';  
 count++;  
 }  
 else  
 {  
 str[count]=str[i];  
 count++;  
 }  
 }  
 str[count]='\0';  
 puts(str);  
}

**Input/Output:** Enter the text (<100 characters)  
The semi-colons ‘;’ will vanish in the next line and commas ‘,’ will replace with ‘.’  
The semicolons ‘’ will vanish in the next line and commas ‘.’ will repace with ‘.’

**Problem-6**

**Problem Statement:** A program to copy the last n characters of a character array in another character array. Also, to convert the lower case letters into upper case while copying.

**Source code:** #include <stdio.h>  
#include <string.h>  
  
void main()  
{  
 int i, n, len;  
 char str[100],strcopy[100];  
 printf("Enter the text(<100 characters)\n");  
 gets(str);  
 len=strlen(str);  
 printf("Enter the number of last characters for copying\n");  
 scanf("%d",&n);  
 for(i=n;i>0;i--)  
 {  
 if(str[len-i]>='a'&&str[len-i]<='z')  
 strcopy[n-i]=str[len-i]-('a'-'A');  
 else strcopy[n-i]=str[len-i];  
 }  
 strcopy[n]='\0';  
 puts(strcopy);  
}

**Input/Output:** Enter the text (<100 characters)  
Hello world was my first program  
Enter the number of last characters for copying  
10  
ST PROGRAM