ISTA Intern Preparation Materials

Exercise 1 - BASIC QUESTIONS

1) Get the three sides of a triangle and check if it is equilateral, isosceles or scalene.

```c
//1) Get the three sides of a triangle and check if it is equilateral, isosceles or scalene.
#include <stdio.h>
float s1,s2,s3;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input()
{
    printf("\nEnter length of  the first side:");
    scanf("%Ff",&s1);
    printf("\nEnter length of  the second side:");
    scanf("%f",&s2);
    printf("\nEnter length of  the third side:");
    scanf("%f",&s3);
}
void output()
{
    if (s1==s2 && s2==s3){
        printf("\nIt is an Equilateral Triangle\n");
    }
    else if(s1==s2 || s1==s3 || s2==s3){
        printf("\nIt is an Isosceles Triangle\n");
    }
    else{
        printf("\nIt is a Scalene Triangle\n");
    }
}

```

```
Enter length of  the first side:12.5

Enter length of  the second side:12.5

Enter length of  the third side:12.5

It is an Equilateral Triangle
```

```
Enter length of  the first side:5.6

Enter length of  the second side:7.8

Enter length of  the third side:5.6

It is an Isosceles Triangle
```

```
Enter length of  the first side:12

Enter length of  the second side:12.7

Enter length of  the third side:12.4

It is a Scalene Triangle
```

2) Get the month and year and print the number of days in that month

```c
//2) Get the month and year and print the number of days in that month
# include<stdio.h>
int month,yr,res,i,j;
int ar[20]={1,3,5,7,8,10,12};
int ar2[20]={4,6,9,11};
void main()
{
    void input();
    void cal();
    void output();
    input();
    cal();
    output();
}
void input()
{
   printf("Enter month:");
   scanf("%d",&month);
   printf("Enter year:");
   scanf("%d",&yr);
}
void cal()
{
    for(i=0;ar[i]!=NULL;i++){
        if(month==ar[i]){
            res=31;
            break;
        }
    }
    for(i=0;ar2[i]!=NULL;i++){
        if(month==ar2[i]){
            res=30;
            break;
        }
    }
```

```
    if (month==2){
        if(((yr % 4 == 0) && (yr % 100 != 0)) || (yr % 400 == 0)){
            res=29;
        }
        else{
            res=28;
        }
    }
}
void output()
{
    printf("Number of Days = %d",res);
}
```

```
Enter month:2
Enter year:1900
Number of Days = 28
```

```
Enter month:11
Enter year:1765
Number of Days = 30
```

```
Enter month:2
Enter year:1808
Number of Days = 29
```

```
Enter month:2
Enter year:2022
Number of Days = 28
```

```
Enter month:4
Enter year:1989
Number of Days = 30
```

```
Enter month:2
Enter year:2016
Number of Days = 29
```

```
Enter month:3
Enter year:2009
Number of Days = 31
```

```
Enter month:1
Enter year:2067
Number of Days = 31
```

3) Reverse of a number

```c
//3) Reverse of a number
# include <stdio.h>
int n,res=0,rem;
void main()
{
    void input();
    void cal();
    void output();
    input();
    cal();
    output();
}
 void input()
 {
     printf("Enter the number:");
     scanf("%d",&n);
 }
 void cal()
 {
     while (n>0){
         rem=n%10;
         res=res*10+rem;
         n=n/10;
     }
 }
 void output()
 {
     printf("Reversed Number:%d",res);
 }
```

```
Enter the number:200
Reversed Number:2
```

```
Enter the number:58675
Reversed Number:57685
```

```
Enter the number:540
Reversed Number:45
```

4) Series GP

```c
//4) Series GP
//an=a1(r^(n-1))
# include <stdio.h>
# include <math.h>
int a,r,n,res;
void main(){
    void input();
    void output();
    input();
    output();
}
void input()
{
    printf("Enter the first term of the GP:");
    scanf("%d",&a);
    printf("Enter the common ratio of the GP:");
    scanf("%d",&r);
    printf("Enter the term in GP you want:");
    scanf("%d",&n);
}
void output()
{
    res=a*(pow(r,(n-1)));
    printf("The required term is : %d",res);
}
```

```
Enter the first term of the GP:4
Enter the common ratio of the GP:3
Enter the term in GP you want:3
The required term is : 36
```

```
Enter the first term of the GP:2
Enter the common ratio of the GP:2
Enter the term in GP you want:4
The required term is : 16
```

5) Reverse a string and check if it’s a palindrome

```c
//5) Reverse a string and check if it’s a palindrome
#include <stdio.h>
#include <string.h>
char s[20];
int i, len,chk;
void main(){
    printf("Enter a string:");
    scanf("%s", &s);

    len = strlen(s);

    for(i=0;i < len ;i++){
        if(s[i]!=s[len-i-1]){
            chk = 1;
            break;
          }
        }

    if (chk) {
        printf("%s is not a palindrome", s);
    }
    else {
        printf("%s is a palindrome", s);
    }
}
```

```
Enter a string:aabbaa
aabbaa is a palindrome
```

```
Enter a string:man
man is not a palindrome
```

6) Find if a number is an armstrong number

```c
//6) Find if a number is an armstrong number :
# include <stdio.h>
int ip,res=0,rem,temp;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input(){
    printf("\nEnter a number:");
    scanf("%d",&ip);
}
void output(){
    temp=ip;
    while(ip>0){
        rem=ip%10;
        res=res+rem*rem*rem;
        ip=ip/10;
    }
    if(res==temp){
        printf("%d is an Armstrong Number",temp);
    }
    else{
        printf("%d is not an Armstrong Number",temp);
    }
}
```

```
Enter a number:153
153 is an Armstrong Number
```

```
Enter a number:256
256 is not an Armstrong Number
```

7) Search an element in an array

```c
//7) Search an element in an array
int ar[20],elem,n,i,op=0;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input(){
    printf("How many elements in array?:");
    scanf("%d",&n);
    for(i=0;i<n;i++){
        printf("Enter element:");
        scanf("%d",&ar[i]);
    }
    printf("\nCreated Array:\n");
    for(i=0;i<n;i++){
        printf("%d  ",ar[i]);
    }
    printf("\nElement to be searched for:");
    scanf("%d",&elem);
}
void output()
{
    for(i=0;i<n;i++){
        if(ar[i]==elem){
            printf("Element in Array");
            op=1;
            break;
        }
    }
    if(op==0){
        printf("Element not in array");
    }
}
```

```
How many elements in array?:3
Enter element:87
Enter element:6
Enter element:4

Created Array:
87  6  4
Element to be searched for:510
Element not in array
```

```
How many elements in array?:3
Enter element:87
Enter element:6
Enter element:4

Created Array:
87  6  4
Element to be searched for:87
Element in Array
```

8) Print n fibonacci terms using iteration and recursion.

```c
// 8)Print n fibonacci terms using iteration and recursion.
#include <stdio.h>
int n;
int fib(int n)
{
    if (n <= 1){
        return n;
    }
    return fib(n - 1) + fib(n - 2);
}
void main()
{
    printf("Enter the term:");
    scanf("%d",&n);
    printf(" The term is %d", fib(n));
}
```

```
Enter the term:4
 The term is 3
```

9) Given a string, count the number of alphabets in it.

```c
//9) Given a string, count the number of alphabets in it.
# include <stdio.h>
# include <string.h>
char  s[20];
int i,count=0;
void main()
{
    void cal();
    printf("Enter a string:");
    gets(s);
    cal();
}
void cal()
{
    int len=strlen(s);
    for (i=0;i<len;i++)
    {
        if((s[i]>=65 && s[i]<=90) || (s[i]>=97 && s[i]<=122))
        {
            count+=1;
        }
    }
    printf("The number of alphabets = %d",count);
}
```

```
Enter a string:Info@12
The number of alphabets = 4
```

10) Check if two strings are anagrams

```c
//10) Check if two strings are anagrams
# include <stdio.h>
# include <string.h>
char  s1[20],s2[20];
int i,j,count=0,final=0;
void main()
{
    void input();
    void cal();
    input();
    cal();
}
void input()
{
    printf("Enter a string:");
    gets(s1);
    printf("Enter another string:");
    gets(s2);
}
void cal(){
    for(i=0;s1[i]!=NULL;i++){
        for(j=0;s2[j]!=NULL;j++){
            if(s1[i]==s2[j]){
                count=count+1;
            }
        }
    }
    if(count==strlen(s1)){
        printf("ANAGRAM");
    }
    else{
        printf("NOT ANAGRAM");
    }
}
```

```
Enter a string:mat
Enter another string:mac
NOT ANAGRAM
```

```
Enter a string:tap
Enter another string:pat
ANAGRAM
```

11) Reverse an array

```c
//11) Reverse an array
# include <stdio.h>
int ar[20],i,n;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input(){
    printf("How many elements?:");
    scanf("%d",&n);
    for(i=0;i<n;i++){
        printf("Enter element:");
        scanf("%d",&ar[i]);
    }
    printf("\nOriginal Array:\n");
    for(i=0;i<n;i++){
        printf("%d ",ar[i]);
    }
}
void output(){
    printf("\nReversed array:\n");
    for(i=n-1;i>-1;i--){
        printf("%d  ",ar[i]);
    }
}
```

```
How many elements?:4
Enter element:89
Enter element:77
Enter element:14
Enter element:96

Original Array:
89 77 14 96
Reversed array:
96  14  77  89
```

12) Given an array, find the second largest number

```c
//12) Given an array, find the second largest number.
# include <stdio.h>
int ar[20],i,n,op=0,op2=0;
void main()
{
    void input();
    void output();
    void cal();
    input();
    output();
}
void input(){
    printf("How many elements?:");
    scanf("%d",&n);
    for(i=0;i<n;i++){
        printf("Enter element:");
        scanf("%d",&ar[i]);
    }
    printf("\nOriginal Array:\n");
    for(i=0;i<n;i++){
        printf("%d ",ar[i]);
    }
}
void cal()
{
    for(i=0;i<n;i++){
       if(ar[i]>op){
           op=ar[i];
       }
   }
}
```

```
void output(){
    for(i=0;i<n;i++){
        if(ar[i]>op){
            op=ar[i];
        }
   }
   for(i=0;i<n;i++){
        if(ar[i]==op){
            ar[i]=0;
        }
   }
   for(i=0;i<n;i++){
        if(ar[i]>op2){
            op2=ar[i];
        }
   }
   printf("\nThe second largest number is %d",op2);
}
```

```
How many elements?:3
Enter element:1
Enter element:5
Enter element:7

Original Array:
1 5 7
The second largest number is 5
```

13) Single number

```c
//13) Single number.
# include <stdio.h>
int ar[20],i,n,j,count=0;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input(){
    printf("How many elements?:");
    scanf("%d",&n);
    for(i=0;i<n;i++){
        printf("Enter element:");
        scanf("%d",&ar[i]);
    }
    printf("\nOriginal Array:\n");
    for(i=0;i<n;i++){
        printf("%d ",ar[i]);
    }
}
void output(){
    int temp;
    for(i=0;i<n;i++){
        count=0;
        temp=ar[i];
        for(j=0;j<n;j++){
            if(temp==ar[j]){
                count=count+1;
            }
        }
        if (count!=2){
            printf("\nSINGLE NUMBER: %d ",temp);
            break;
        }

    }
}
```

```
How many elements?:5
Enter element:6
Enter element:4
Enter element:8
Enter element:8
Enter element:6

Original Array:
6 4 8 8 6
SINGLE NUMBER: 4
```

14) Maximum money

```c
//14) Maximum mone
# include <stdio.h>
int n,k,i,ans=0;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input(){
    printf("Enter number of houses:");
    scanf("%d",&n);
    printf("Enter money in each house:");
    scanf("%d",&k);
}
void output(){
    for(i=1;i<=n;i+=2){
        ans=ans+k;
    }
    printf("\nMaximum Money = %d",ans);
}
```

```
Enter number of houses:5
Enter money in each house:10

Maximum Money = 30
```

15) Check if the given elements are in the given range

```c
//15) Check if the given elements are in the given range
# include <stdio.h>
int ar[20],i,n,j,a,b,ans=0;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input(){
    printf("How many elements?:");
    scanf("%d",&n);
    for(i=0;i<n;i++){
        printf("Enter element:");
        scanf("%d",&ar[i]);
    }
    printf("Enter starting value:");
    scanf("%d",&a);
    printf("Enter ending value:");
    scanf("%d",&b);
    printf("\nOriginal Array:\n");
    for(i=0;i<n;i++){
        printf("%d ",ar[i]);
    }
}
void output(){
    for(i=a;i<b;i++){
        ans=0;
        for(j=0;j<n;j++){
            if(i==ar[j]){
                ans=1;
        }
        }
```

```
35          if(ans==0){
36              printf("\nElements not in range");
37              break;
38          }
39          else {
40              printf("\nElements in range");
41              break;
42          }
43      }
44  }
```

```
How many elements?:7
Enter element:1
Enter element:4
Enter element:5
Enter element:2
Enter element:7
Enter element:8
Enter element:3
Enter starting value:2
Enter ending value:5

Original Array:
1 4 5 2 7 8 3
Elements in range
```

```
How many elements?:3
Enter element:5
Enter element:4
Enter element:7
Enter starting value:3
Enter ending value:8

Original Array:
5 4 7
Elements not in range
```

16) Total fine

```c
//16) Total fine
# include <stdio.h>
int i,n,car[20],fine[20],date,total;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input(){
    printf("How many Cars?:");
    scanf("%d",&n);
    for(i=0;i<n;i++){
        printf("Enter car number:");
        scanf("%d",&car[i]);
        printf("Enter fine amount:");
        scanf("%d",&fine[i]);
    }
    printf("\nCar Array:\n");
    for(i=0;i<n;i++){
        printf("%d ",car[i]);
    }
    printf("\nFine Array:\n");
    for(i=0;i<n;i++){
        printf("%d ",fine[i]);
    }
    printf("\nEnter date:");
    scanf("%d",&date);
}
```

```
void output(){
    if(date%2==0){
        for(i=0;i<n;i++){
            if(car[i]%2!=0){
                total+=fine[i];
            }
        }
    }
    else{
        for(i=0;i<n;i++){
            if(car[i]%2==0){
                total+=fine[i];
            }
        }
    }
    printf("Toal fine = %d",total);
}
```

```
How many Cars?:3
Enter car number:6857
Enter fine amount:500
Enter car number:2248
Enter fine amount:800
Enter car number:3317
Enter fine amount:400

Car Array:
6857 2248 3317
Fine Array:
500 800 400
Enter date:14
Toal fine = 900
```

17) Given an array, find the sum of elements at odd index and elements at even index

```c
//17) Given an array, find the sum of elements at odd index and elements at even index
# include <stdio.h>
int i,n,ar[20],sume,sumo;
void main()
{
    void input();
    void output();
    input();
    output();
}
void input(){
    printf("How many elements?:");
    scanf("%d",&n);
    for(i=0;i<n;i++){
        printf("Enter element:");
        scanf("%d",&ar[i]);
    }
    printf("\nOriginal Array:\n");
    for(i=0;i<n;i++){
        printf("%d ",ar[i]);
    }
}
void output(){
    for(i=0;i<n;i++){
        if((i+1)%2==0){
            sume+=ar[i];
        }
        else{
            sumo+=ar[i];
        }
    }
    printf("\nOdd places: %d\nEven places: %d",sumo,sume);
}

```

```
How many elements?:5
Enter element:1
Enter element:2
Enter element:3
Enter element:4
Enter element:5

Original Array:
1 2 3 4 5
Odd places: 9
Even places: 6
```