

MCS 011 Solved Assignment 2014-2015

Course Code : MCS-011
Course Title : Problem Solving and Programming
Assignment Number : MCA(1)/011/Assign/2014-15
Maximum Marks : 100
Weightage : 25%

Last Dates for Submission : 15th October, 2014 (For July 2014 Session)
15th April, 2015 (For January 2015 Session)

There are six questions in this assignment, which carries 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Insert comments in the coding for better understanding.

Question : 1

Write an algorithm, draw a corresponding flowchart and write an interactive C program to prompt the user to input 3 integer values and print these values in forward and reversed order, as shown below.

Sample Output:

Please enter your 3 numbers: 21 35 66

Your numbers forward:

21

35

66

Your numbers reversed:

66

35

21

Solution :

Pseudo code:

- Input 3 Number
- Initialize I and J to zero
- For Num[I] is less than 3
 - For Num[J] is less than 3
 - If Num[I]<Num[J]
 - Swap Num[I] with Num[J]
 - Increment J
- Increment I
- Print Forward Array using For loop
- Print Reverse Array using For loop

Detailed Algorithm:

Step 1: Input 3 values in array Num[3]

Step 2: For(I = 0 ; I < 3 ; I++)

Step 3: For(J = 0 ; J < 3 ; J++)

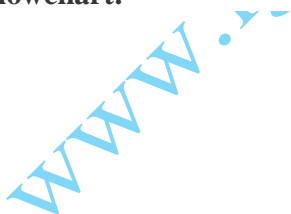
If Num[I]<Num[J]

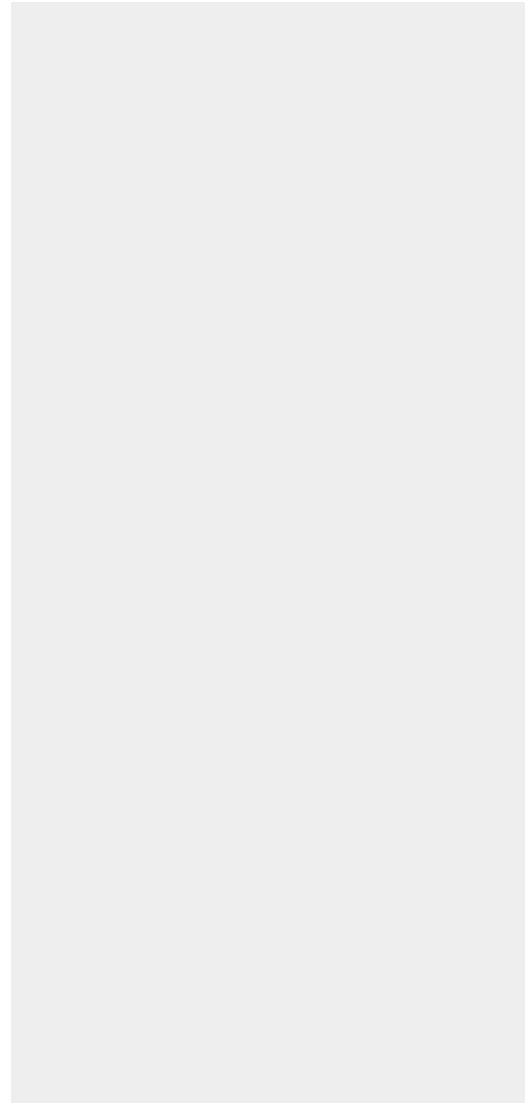
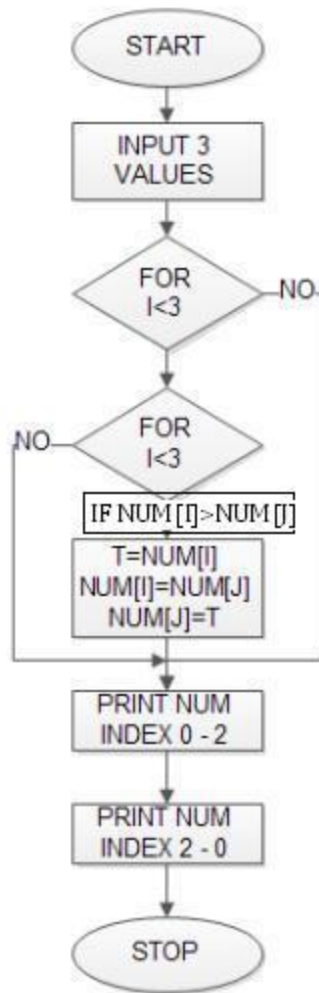
Swap Num[I] with Num[J]

Step 4: Print Forward Array using For loop

Step 5: Print Reverse Array using For loop

Flowchart:



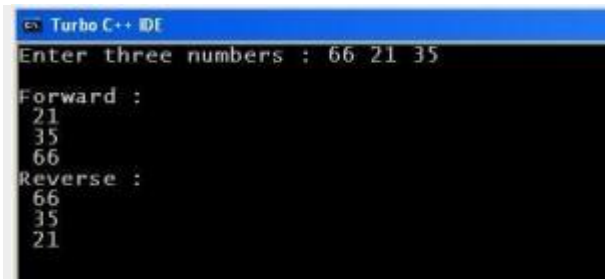


Program Code:

```
#include<stdio.h>
void main()
{
int i,j,t,num[3];
clrscr();
printf("Enter three numbers : ");
scanf("%d%d%d",&num[0],&num[1],&num[2]);
for(i=0;i<3;i++)
{
for(j=0;j<3;j++)
{
if(num[i]<num[j])
{
t=num[i];
num[i]=num[j];
num[j]=t;
}
}
}
}
```

```
printf("\nForward : ");
for(i=0;i<3;i++)
printf("\n %d ",num[i]);
printf("\nReverse : ");
for(i=2;i>=0;i-)
printf("\n %d ",num[i]);
getch();
}
```

Screen Shots:



The screenshot shows a Turbo C++ IDE window with a black background and white text. The prompt 'Enter three numbers : 66 21 35' is at the top. Below it, the output is displayed: 'Forward : 21 35 66' and 'Reverse : 66 35 21'.

Question : 2

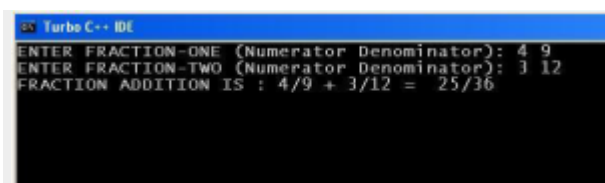
Write a C program to add two fractions and display the resultant fraction. The program should prompt the user to input *Fraction-One* and *Fraction-Two*. The numerator and denominator of each fraction's are input separately by space.

Solution :

```
#include<stdio.h>
int lcm(int,int);
void main()
```

```
{
int NM,NM1,DN1,NM2,DN2,LCM;
clrscr();
printf("ENTER FRACTION-ONE (Numerator Denominator): ");
scanf("%d%d",&NM1,&DN1);
printf("ENTER FRACTION-TWO (Numerator Denominator): ");
scanf("%d%d",&NM2,&DN2);
LCM = lcm(DN1,DN2);
//printf("LCM OF TWO NUMBERS IS %d",LCM);
printf("FRACTION ADDITION IS : ");
printf("%d/%d + %d/%d = ",NM1,DN1,NM2,DN2);
NM1=NM1*(LCM/DN1);
NM2=NM2*(LCM/DN2);
NM=NM1+NM2;
printf(" %d/%d",NM,LCM);
getch();
}
int lcm(int N1,int N2)
{
static int TEMP = 1;
if(TEMP % N2 == 0 && TEMP % N1 == 0)
return TEMP;
TEMP++;
lcm(N1,N2);
return TEMP;
}
```

Screen Shots:



The screenshot shows the Turbo C++ IDE with the following output displayed in the console window:

```
ENTER FRACTION-ONE (Numerator Denominator): 4 9
ENTER FRACTION-TWO (Numerator Denominator): 3 12
FRACTION ADDITION IS : 4/9 + 3/12 = 25/36
```

Question : 3

Write an interactive C program to calculate the total and average of scores of a selected student. The program should prompt the student to input the *stu_id*. This *stu_id* is checked against the *stu_ids* and make sure it really exists. Calculate the total and average, if the scores in assignment1 (out of 10 marks), assignment2 (out of 10 marks), mid-term score (out of 30 marks), and final score (out of 50 marks) are given.

Solution :

```
#include<stdio.h>
struct student
{
unsigned long int ENROL;
char NAME[15];
int ASGN1,ASGN2,MIDT,FINL;
}STUD[12]={
{102038400,"GANESH",5,7,25,32},
{102038401,"MAHESH",8,6,21,35},
{102038402,"SURESH",5,4,23,40},
{102038403,"KALPESH",8,9,24,36},
{102038404,"RAHUL",4,6,25,36},
{102038405,"SUBBU",9,8,16,48},
{102038406,"RAKESH",5,7,18,34},
{102038407,"ATUL",5,8,19,41},
{102038408,"DHARMESH",5,7,22,32},
{102038409,"AJAY",5,4,20,36},
```

```
{102038410,"ABDUL",7,6,24,41},
{102038411,"RASHMI",6,5,25,34}
};
void main()
{
unsigned long int ENROL_NO;
void gen_result(unsigned long int);
clrscr();
printf("ENTER THE Enroll bwtn 102038400 to 8411 : ");
scanf("%ld",&ENROL_NO);
if(ENROL_NO>102038399 && ENROL_NO<102038412)
gen_result(ENROL_NO);
else
printf("\nYOU HAVE ENTERED WRONG ENROLMENT NO. !!");
getch();
}
void gen_result(unsigned long int ENROL)
{
char STATUS;
int AVG,TOTL;
printf("\n\t\t\tINDIRA GANDHI NATIONAL OPEN UNIVERSITY");
printf("\n\t\t\tTERM-END EXAMINATION (DEC – 2013)");
printf("\n\n\tENROLMENT NO.\t: %ld",ENROL);
printf("\n\tNAME\t\t: %s",STUD[ENROL-102038400].NAME);
printf("\n\tPROGRAMME CODE \t: MCA");
printf("\n\tCOURSE CODE \t: MCS011");
printf("\n\t_____");
printf("\n\t NAME \t\t ACTUAL MARKS \tOUT OF 100 MARKS\tSTATUS");
printf("\n\t_____");
if(STUD[ENROL-102038400].ASGN1<4) STATUS='N'; else STATUS='S';
printf("\n\tASSIGNMENT1\t\t%d\t\t%d\t\t%c",STUD[ENROL-
102038400].ASGN1,STUD[ENROL-102038400].ASGN1*10,STATUS);
if(STUD[ENROL-102038400].ASGN2<4) STATUS='N'; else STATUS='S';
printf("\n\n\tASSIGNMENT2\t\t%d\t\t%d\t\t%c",STUD[ENROL-
102038400].ASGN2,STUD[ENROL-102038400].ASGN2*10,STATUS);
if(STUD[ENROL-102038400].MIDT<12) STATUS='N'; else STATUS='S';
```

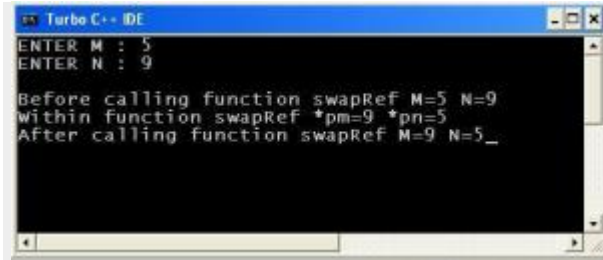

Question : 4

Write an interactive C program to swap the values of two given variables, using pointers.

Solution :

```
# include <stdio.h>
void main()
{
int M,N;
void swapRef ( int *, int * );
clrscr();
printf("ENTER M : ");
scanf("%d",&M);
printf("ENTER N : ");
scanf("%d",&N);
printf ("\nBefore calling function swapRef M=%d N=%d",M,N);
swapRef (&M,&N); /*address of arguments are passed */
printf ("\nAfter calling function swapRef M=%d N=%d",M,N);
getch();
}
void swapRef (int *pm, int *pn)
{
int temp;
temp = *pm;
*pm = *pn;
*pn = temp;
printf ("\nWithin function swapRef *pm=%d *pn=%d",*pm,*pn);
return;
}
```

Screen Shots:



```
Turbo C++ IDE
ENTER M : 5
ENTER N : 9
Before calling function swapRef M=5 N=9
within function swapRef *pm=9 *pn=5
After calling function swapRef M=9 N=5_
```

Question : 5

Write an interactive program called “DISTANCE CONVERTER” that accepts the distance/length in centimetres / kilometres /miles and displays its equivalent in metres.

Solution :

```
#include<stdio.h>
void main()
{
int NUM;
float DISTANCE,METERS;
clrscr();
printf(“SELECT MEASURING METRICS”);
printf(“\n 1. CENTIMETERS\n”);
printf(“\n 2. KILOMETERS\n”);
printf(“\n 3. MILES\n”);
printf(“ENTER CHOICE HERE :”);
scanf(“%d”,&NUM);
switch(NUM)
```

```
{
case 1 : printf("\n SELETED CENTIMETERS TO METERS\n");
break;
case 2 : printf("\n SELETED KILOMETERS TO METERS\n");
break;
case 3 : printf("\n SELETED MILES TO METERS\n");
break;
default : printf("YOU HAVE ENTERED WRONG CHOICE !!!");
goto QUIT;
}
printf("ENTER WEIGHT HERE :");
scanf("%f",&DISTANCE);
switch(NUM)
{
case 1 : METERS=DISTANCE/100;
printf("\n %.2f CENTIMETERS IS %.2f METERS\n",DISTANCE,METERS);
break;
case 2 : METERS=DISTANCE*1000;
printf("\n %.4f KILOMETERS IS %.4f METERS\n",DISTANCE,METERS);
break;
case 3 : METERS=(DISTANCE*1609344)/1000;
printf("\n %.4f MILES IS %.4f METERS\n",DISTANCE,METERS);
break;

}
QUIT:
getch();
}
```

Screen Shots:

```
Turbo C++ IDE
SELECT MEASURING METRICS
1. CENTIMETERS
2. KILOMETERS
3. MILES
ENTER CHOICE HERE :3
SELETED MILES TO METERS
ENTER WEIGHT HERE :1
1.0000 MILES IS 1609.3440 METERS
```

Question : 6

Write an interactive C program to display a table that represents a Pascal 4 triangle of any size.

Hint: In Pascal triangle, the first and the second rows are set to 1. Each element of the triangle (from the third row downward) is the sum of the element directly above it and the element to the left of the element directly above it. See the below given example Pascal Triangle of size=5:

1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

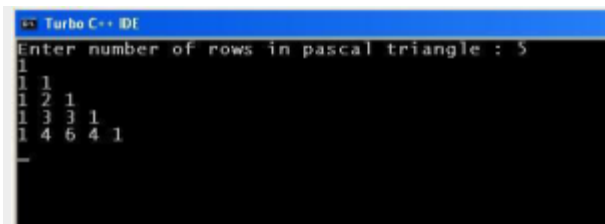
Solution :

```
#include<stdio.h>
long fact(int);
```

```
void main()
{
int i,j,num,n;
clrscr();
printf("Enter number of rows in pascal triangle : ");
scanf("%d",&num);
for(i=0;i<num;i++)
{
for(j=0;j<=i;j++)
{
n=fact(i)/(fact(j)*fact(i-j));
printf("%d ",n);
}
printf("\n");
}
getch();
}
```

```
long fact(int n)
{
int x;
long res=1;
for(x=1;x<=n;x++)
res=res*x;
return(res);
}
```

Screen Shots:



```
Turbo C++ IDE
Enter number of rows in pascal triangle : 5
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
```

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