**Programming Fundamentals**

**BS-CS Fall 2015 (**MORNING**)**

**Assignment #2**



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Q#1

Write pseudo code to generate a following numbers structure:

1  
1 2 1  
1 2 3 2 1  
1 2 3 4 3 2 1

1 2 3 4 5 4 3 2 1

Solution:

start

l=5 ,i=1 , j, k

// I is outer loop control, j is inner loop control , k holds printing values

while (l>=1)

{

j=1

k=1

while (j<=i+4)

{

If (j<l)

Print "\t"

else

{

Print"\t", k

if(j<5)

k=k+1

else

k=k-1

}

j=j+1

}

i=i+1

l=l-1

Print "\n"

}

End

Q#2:

Write a pseudo code to print Pascal triangle.  
1  
1 1  
1 2 1  
1 3 3 1  
1 4 6 4 1

Solution:

start

i=1, j, k ,x=1 ,lines=5

while (i<=lines)

{

spaces=lines

while (spaces >=i)

{

Print " "

spaces= spaces -1

}

k=x

while (k!=0)

{

Print k%10

k=k/10

}

x=x\*11

Print "\n"

i=i+1

}

End

Q#3:Write a pseudo code to display the following number structure:  
123454321  
2345432  
34543  
454  
5

Solution:

Start

lineNumber=0,totalLines=5,i,j

while(lineNumber<=totalLines)

{

i=1

j=0

while(i<totalLines\*2-lineNumber)

{

if(i<=totalLines)

j=j+1

else

j=j-1

if(i<=lineNumber)

Print " "

else

Print j

i=i+1

}

Print "\n"

lineNumber= lineNumber+1

}

END

Q#4: Write pseudo code to display the following.  
A  
AB  
ABC  
ABCD  
ABCDE  
ABCD  
ABC  
AB  
A

Solution:

Start

totalLines=9,mid=totalLines/2+1, lineNumber=1, spaces, characters,ch

while(lineNumber<=totalLines)

{

if (lineNumber<=mid)

{

spaces=mid-lineNumber

characters =lineNumber

}

else {

spaces=lineNumber-mid

characters =totalLines-lineNumber+1

}

While (spaces>=1){

Print " "

Spaces= spaces-1

}

ch='A'

while (characters>=1)

{

Print ch

ch =ch+1

characters = characters-1

} lineNumber= lineNumber+1

Print "\n"

} END

Q#5:Write a C program to print the following number rectangle structure:   
12321

12 21

1 1

12 21

12321

Solution:

#include<stdio.h>

main()

{

int lineNumber=1, totalLines=5 ,i,mid=totalLines/2+1,j ;

while(lineNumber<=mid)

{

i=1;

j=1;

while (i<=mid)

{

if (lineNumber+i>=5)

printf(" ");

else

printf("%d" ,j);

i++;

j++;

}

i=1;

j=2;

while (i<mid)

{

if(i<lineNumber-1)

printf(" ");

else

printf("%d" ,j);

i++;

j--;

}

printf("\n");

lineNumber++;

}

while(lineNumber<=totalLines)

{

i=1;

j=1;

while(i<=totalLines)

{

if(i==3 && lineNumber==totalLines-1)

printf(" ");

else

printf("%d",j);

i++;

if(i<=mid)

j++;

else

j--;

}

lineNumber++;

printf("\n");

}

}

Q#6:

Write pseudo code to print binary equivalent of a decimal number.  
a. Input a decimal number  
b. Show how many bits required to store its binary equivalent (8, 16, 24 or 32)  
c. Convert and print its binary equivalent

Solution:

number ,binary=0,bits,i , x=1;

Input "Enter a Number : " number

bits=0

i=number

while (i>0)

{

binary=binary+(i%2)\*x

i=i/2

x=x\*10

bits=bits+1

}

Print "bits required are”,bits “\nbinary is :”,binary

}

END

Q#7:

Write pseudo code to do following:  
a. Input a valid 6-digit binary number  
b. Assume it as unsigned number, convert and print its decimal equivalent.

c. Assume it as signed number, convert and print its decimal equivalent.

Solution (a ,b):

i=1,j,k=0, binary, decimal=0

input "Enter a binary Number : ",binary

j=binary

while (i<=6)

{

if(j%10>1)

k=k+1

j=j/10

i=i+1

}

if (k>0)

Print " It is not abinary Number"

else if (j>0)

Print " It exceeds limit "

else

{

i=1,j=1

while(j<=6)

{

decimal=decimal+(binary%10)\*i;

binary=binary/10;

i=i\*2

j=j+1

}

Print decimal

}

Print "\n"

}

END

Solution (A,C):

START

i,j, k=0,loop,binary,decimal=0

Input "Enter 6 digit binary of a Number : ", binary

i=1 ,j=binary

while (i<=6)

{

if(j%10>1)

k=k+1

i=i+1

j=j/10;

}

if (k>0)

print "It is not a binary Number "

else if (j>0)

print " It exceeds limit "

else

{

loop=1 ,j=binary ,i=1

while (j>0)

{

If (loop==6)

decimal =decimal-(j%10)\*i;

else

decimal =decimal+(j%10)\*i;

j=j/10;

i=i\*2;

loop=loop+1

}

Print decimal

}

Print "\n"

END