University of Technology
Computer Science Department
Class: **first class /SW branch**
Time: **3 hours**
Date: **12/6/2011**

Subject: **Fundamental of Programming Techniques**

Examiner: **Msc. Ikhlas F. Nassir**

Final Exam / First Trail / 2010-2011

Q1 Write a high level program to evaluate the following series and then translate it into machine language suppose each character will be coded in five bits.

$$\sum_{i=1}^{5} \sum_{j=1}^{4} i + 4j$$

[20 marks]

Q2 Suppose you have the program.

```
#include <iostream.h>
int search(int a[],int y)
{int i=0;
while (a[i]!=y)
i++;
return(i);
}
int t,x,f;
void sort(int a[])
{
        int k1,k2;
        for(k1=0;k1<=8;k1++)
                for(k2=k1+1;k2<=9;k2++)
                        if(a[k1]>a[k2])
                        {   t=a[k1];
                                a[k1]=a[k2];
                        a[k2]=t;   }
                for(k1=0;k1<=9;k1++)
        cout <<a[k1];
```

[20 marks]

```
         cout<<"enter number to search for it";
                        cin>>x;
                        f=search(a,x);
                cout<<" it found in location="<<f;   }
void main(void)
{       int b[10]={18,7,4,9,1,0,16,30,89,50};
sort(b);}
```

Answer only one question: -

a) Draw a diagram for execution state at start of subprogram search and determine CEP and CIP.

b) Trace the program into a diagram for program interpretation and execution and then determine the local and non local variables.

Q3 Convert the following code segment into flowchart

```
      Read X
  1 A=X/2
  2 B=(X/A+A)/2
      C=B-A
      If C<0   then C=-C
      If C<10^-6  then Goto 3
       A=B
       Goto 2
  3   write B
       Stop
      End
```

[15 marks]

Q4 write a recursive algorithm and diagram for computing power (3^3). [15 marks]