

ID \_\_\_\_\_

ICS410-01 (071)

Dr. Mamdouh Najjar

Name: \_\_\_\_\_

Quiz # 3  
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**Question 1:**

**(8 points)**

Consider the following program:

```
Procedure Main is
  X, Y, Z :
Integer;
  Procedure Sub1 is
    A, Y, Z : Integer;
  Procedure Sub2 is
    A, B, Z : Integer;
    begin
      -- of Sub2
    ...
    end;
      -- of Sub2
  begin
    -- Sub1
    ...
  end;
    -- Sub1
  procedure Sub3 is
    A, X, W : Integer;
  begin
    -- Sub3
    ...
  end;
begin
  -- Main

end;
  -- Main
```

List all variables, along with the program units where they are declared, that are visible in the bodies of Sub1, Sub2, and Sub3, assuming static scoping is used.

**Question 2:****(12 points)**

Consider the following program:

```
Procedure Main is
  X, Y, Z :
Integer;
  Procedure Sub1 is
    A, Y, Z : Integer;
    begin                                -- Sub1
      ...
    end;                                -- Sub1
  Procedure Sub2 is
    A, B, Z : Integer;
    begin                                -- of Sub2
      ...
    End;                                -- of Sub2
  procedure Sub3 is
    A, X, W : Integer;
    begin                                -- Sub3
      ...
    end;                                -- Sub3
begin                                    -- Main
...
end;                                    -- Main
```

Given the following calling sequence and assuming that dynamic scoping is used, what variables are visible during execution of the last subprogram activated? Include with each visible variable the name of the unit where it is declared.

a. Main calls Sub1; Sub1 calls Sub2; Sub2 calls Sub3.

b. Main calls Sub3; Sub3 calls Sub2; Sub2 calls Sub1.