CS 345 — Fall 2001	Homework #2
Programming Languages	Due October 1, 2001

1. Write the GCN (Guarded Command Notation) equivalent of the following C statements:

a. Assume here that `s1`, `s2`, `s3`, and `s4` represent arbitrary C statements, and that `A`, `B`, and `C` represent arbitrary C expressions.

```
if (A)
{
   s1;
   if (!B)
   {
      s2;
   }
   else if (C)
   {
      s3;
   }
   else
   {
      s4;
   }
}
```

b.

```
for (i=0; i<n; i++)
{
   for (j=i; j<n; j++)
   {
       k = n-i;
   }
}
```

c.

```
do
{
   s1;
   if (C)
      break;
   s2;
} while (A && B);
```

2. Sethi 5.3.

3. Show the result of the following program under the following scoping schemes.

a. Lexical scoping

b. Dynamic scoping

```
int Penn, Teller;
procedure poof()
{
   int Penn = 7;
   return (Penn + Teller);
}

procedure laugh()
{
   int Teller = 34;
   return (Penn + Teller - poof());
}

main()
{
   Penn = 171;
   Teller = 61;

   Penn = poof();
   print(Penn);

   Penn = laugh();
   print(Penn);
}
```

4. For the following program, show the output under each of the following parameter passing mechanisms:

a. Call by value

b. Call by reference

c. Call by value-result

d. Call by name

```
Michael : integer;

procedure Wizard (Jeffrey: integer)
{
    Michael := Michael-3;
    Jeffrey := Jeffrey+38;
    print(Michael, Jeffrey);
}

main()
{
    Michael := 23;
    Wizard(Michael);
    print(Michael);
}
```