Chapter 10

Problems 1,2,3,4

1. Show the stack with all activation record instances, including static and dynamic chains, when execution reaches position 1 in the following skeletal program. Assume `Bigsub` is at level 1.

```
procedure Bigsub is
procedure A is
procedure B is
begin --of B
... ←----------------------------1
end; --of B
procedure C is
begin --of C
...
B;
...
end; --of C
begin --of A
...
C;
...
end; --of A
begin --of Bigsub
...
A;
...
end; -- of Bigsub
```

Answer:

Bigsub calls A

A calls C

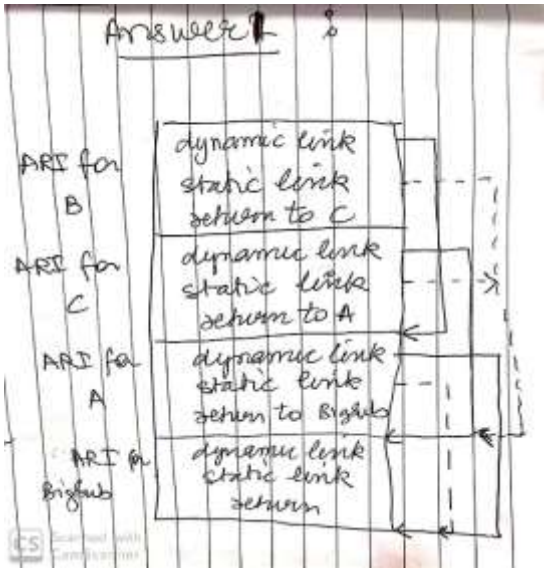
C calls B

---Bigsub

------A

----------B

----------C



2. Show the stack with all activation record instances, including static and dynamic chains, when execution reaches position 1 in the following skeletal program. Assume `Bigsub` is at level 1.

```
procedure Bigsub is
MySum : Float;
procedure A is
X : Integer;
procedure B(Sum : Float) is
Y, Z : Float;
begin --of B
...
C(Z)
...
end; --of B
begin --of A
...
B(X);
...
end; --of A
procedure C(Plums : Float) is
begin --of C
... 1
end; --of C
L : Float;
begin --of Bigsub
...
A;
...
end; -- of Bigsub
```

Answer:

Bigsub calls A

A calls B

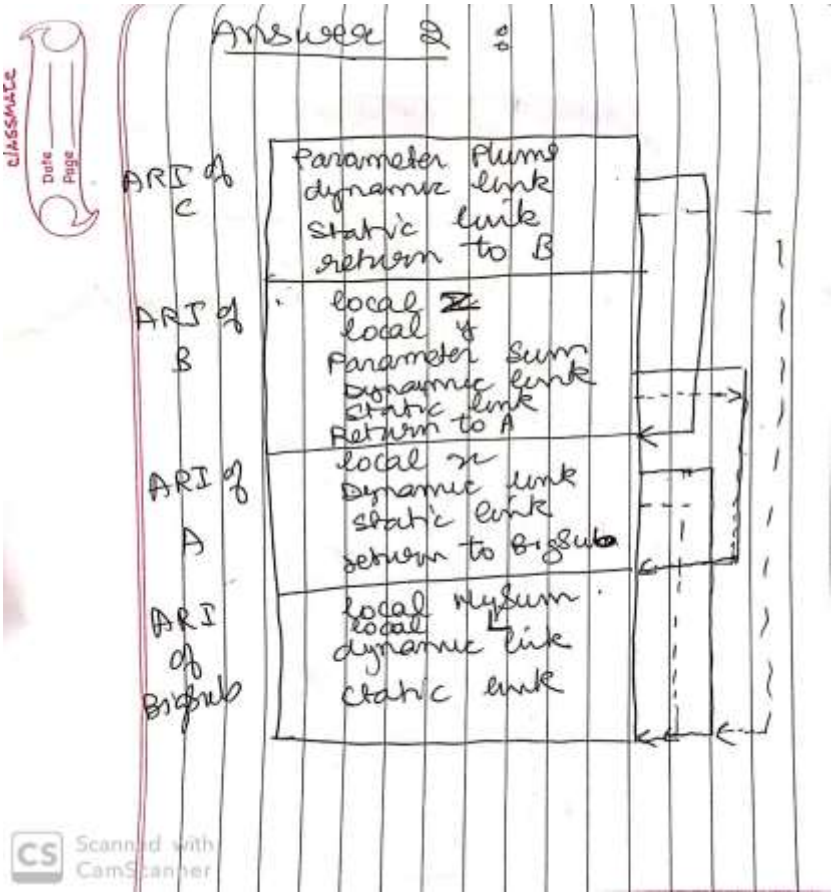
B calls C

--Bigsub

----A

-----B

----C



3. Show the stack with all activation record instances, including static and
dynamic chains, when execution reaches position 1 in the following skeletal program. Assume `Bigsub` is at level 1.


```
procedure Bigsub is
procedure A(Flag : Boolean) is
procedure B is
...
A(false);
end; -- of B
begin -- of A
if flag
then B;
else C;
...
end; -- of A
procedure C is
procedure D is
... 1
end; -- of D
...
D;
end; -- of C
begin -- of Bigsub
...
A(true);
...
end; -- of Bigsub
```

The calling sequence for this program for execution to reach `D` is

`Bigsub` calls `A`
`A` calls `B`
`B` calls `A`
`A` calls `C`
`C` calls `D`

Answer:

`Bigsub` calls `A`
`A` calls `B`
`B` calls `A`
`A` calls `C`
`C` calls `D`

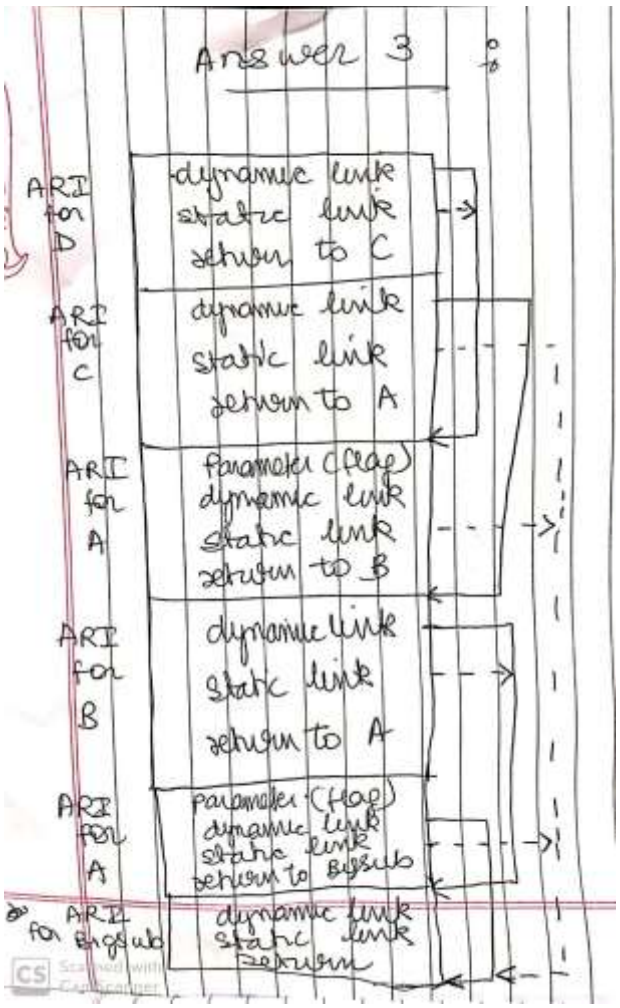
---Bigsub

----A

------B

----C

------D


Answer 3
ARI for D
dynamic link
static link
return to C
ARI for C
dynamic link
static link
return to A
ARI for A
parameter (real)
dynamic link
static link
return to B
ARI for B
dynamic link
static link
return to A
ARI for A
parameter (real)
dynamic link
static link
return to BigSub
ARI for BigSub
dynamic link
static link
return

4. Show the stack with all activation record instances, including the dynamic chain, when execution reaches position 1 in the following skeletal program. This program uses the deep-access method to implement dynamic scoping.

```
void fun1() {
float a;
...
}
void fun2() {
int b, c;
...
}
void fun3() {
float d;
... 1
}
void main() {
char e, f, g;
...
}
```

The calling sequence for this program for execution to reach `fun3` is

`main` calls `fun2`
`fun2` calls `fun1`
`fun1` calls `fun1`
`fun1` calls `fun3`

Answer:

`main` calls `fun2`
`fun2` calls `fun1`
`fun1` calls `fun1`
`fun1` calls `fun3`

Deep Access

Answer 4

DEEP ACCESS