CS3035 Programming Paradigms

Lab 03-2: Implementing Subprograms

Solution

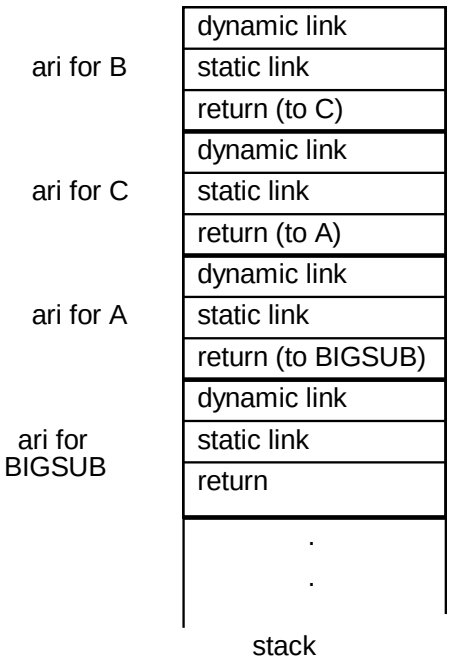
Total Points: 10

Q1: [5 POINTS]

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.

```
function bigsub() {
  function a() {
     function b() {
        ... <---------------------------1
     } // end of b
     function  c() {
       ...
       b();
       ...
     } // end of c
     ...
     c();
     ...
  } // end of a
  ...
  a();
  ...
} // end of bigsub
```

Answer: (see next page)


dynamic link
ari for B
static link
return (to C)
dynamic link
ari for C
static link
return (to A)
dynamic link
ari for A
static link
return (to BIGSUB)
dynamic link
ari for
BIGSUB
static link
return
.
.
stack

Q2: [5 POINTS]

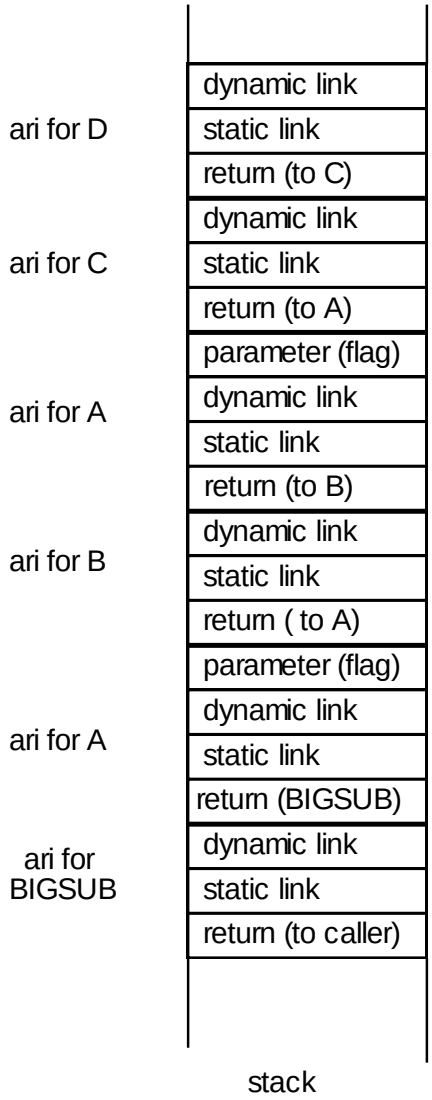
Show the stack with all activation record instances, including static and dynamic chains, when execution reaches position 1 in the following skeletal program. Assume `bigsub` is at level 1.

```
function bigsub() {
function a(flag) {
  function b() {
    ... a(false);
   ...
  } // end of b
  ...
   if (flag)
    b();
   else c();
  ...
} // end of a
 function c() {
   function d() {
    ... <------------------------1
  } // end of d
  ...
  d();
   ...
} // end of c
...
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: (see next page)


dynamic link
ari for D
static link
return (to C)
dynamic link
ari for C
static link
return (to A)
parameter (flag)
dynamic link
ari for A
static link
return (to B)
dynamic link
ari for B
static link
return (to A)
parameter (flag)
dynamic link
ari for A
static link
return (BIGSUB)
dynamic link
ari for
BIGSUB
static link
return (to caller)
stack