

CS3035 Programming Language Paradigms
Lab 03-2: Implementing Subprograms (September 10)

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)

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