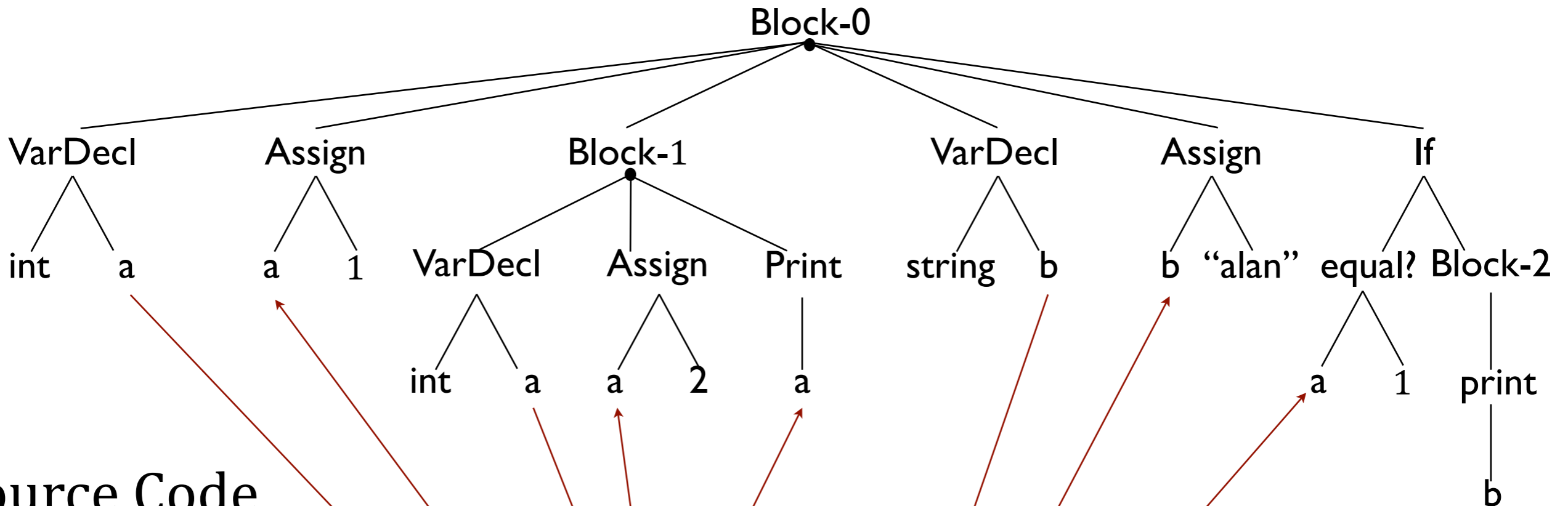


Source Code

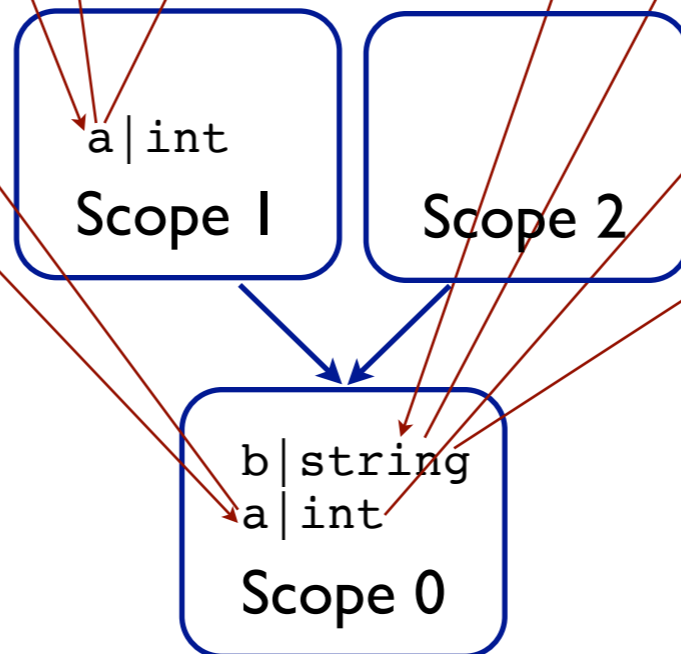
```
{  
    int a  
    a = 1  
    {  
        int a  
        a = 2  
        print(a)  
    }  
    string b  
    b = "alan"  
    if (a == 1) {  
        print(b)  
    }  
}
```

AST



Source Code

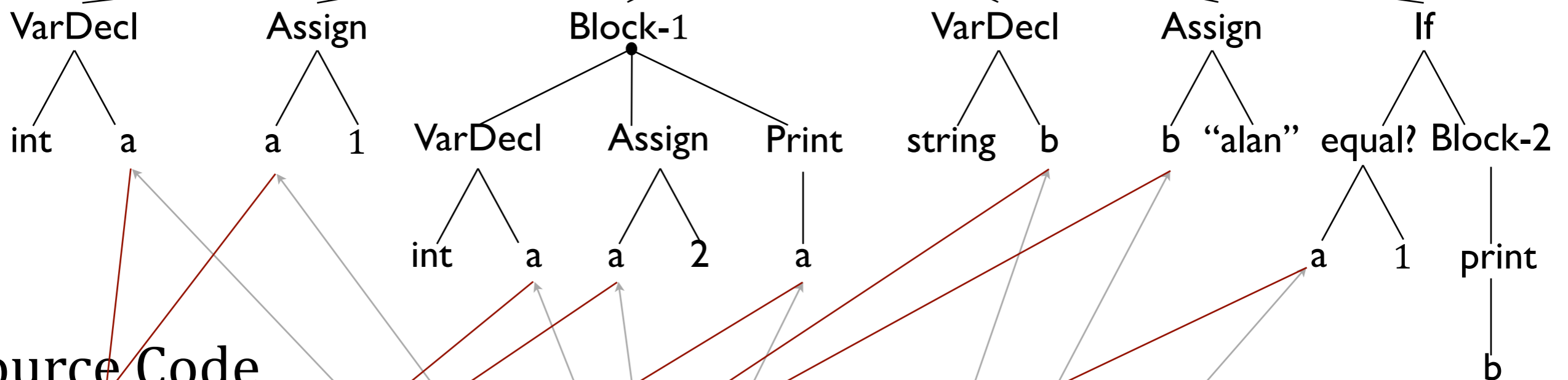
```
{  
  int a  
  a = 1  
  {  
    int a  
    a = 2  
    print(a)  
  }  
  string b  
  b = "alan"  
  if (a == 1) {  
    print(b)  
  }  
}
```



Symbol Table

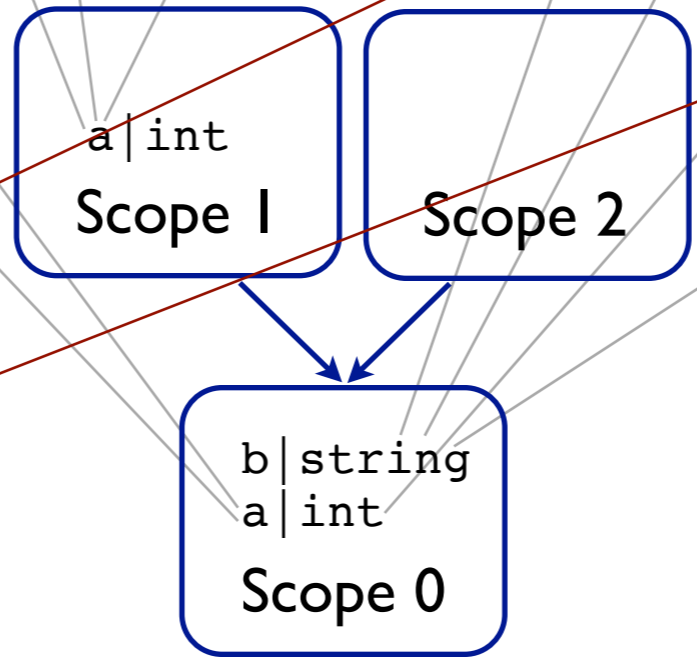
AST

Block-0



Source Code

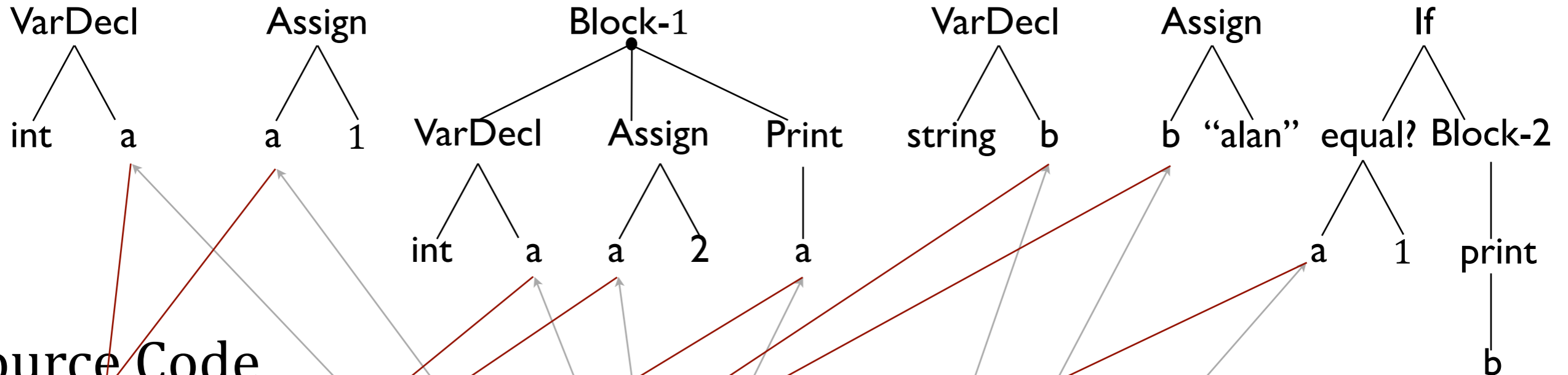
```
{  
  int a@a0  
  a@a0 = 1  
  {  
    int a@a1  
    a@a1 = 2  
    print(a@a1)  
  }  
  string b@a0  
  b@a0 = "alan"  
  if (a@a0 == 1) {  
    print(b@a0)  
  }  
}
```



Symbol Table

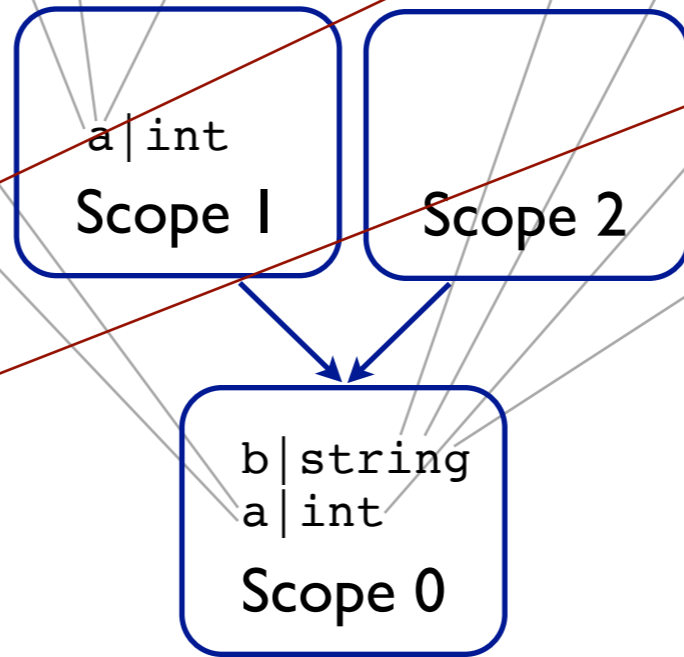
AST

Block-0



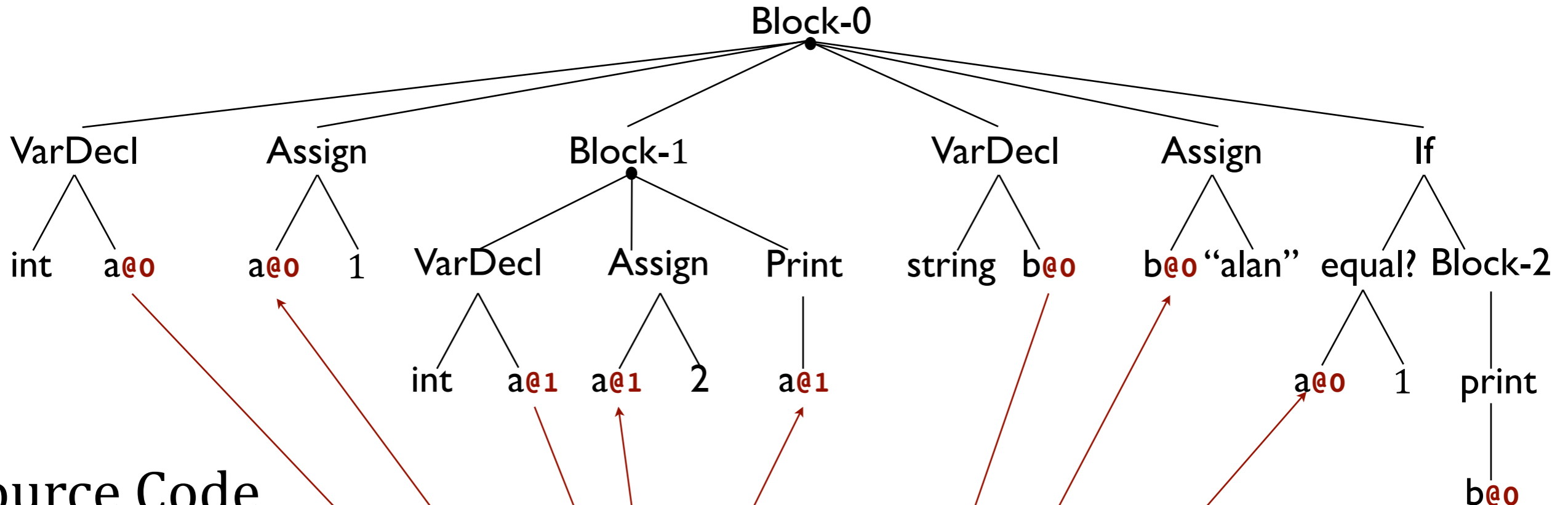
Source Code

```
{  
  int a@0:int  
  a@0:int = 1  
  {  
    int a@1:int  
    a@1:int = 2  
    print(a@1:int)  
  }  
  string b@0:string  
  b@0:string = "alan"  
  if (a@0:int == 1) {  
    print(b@0:string)  
  }  
}
```



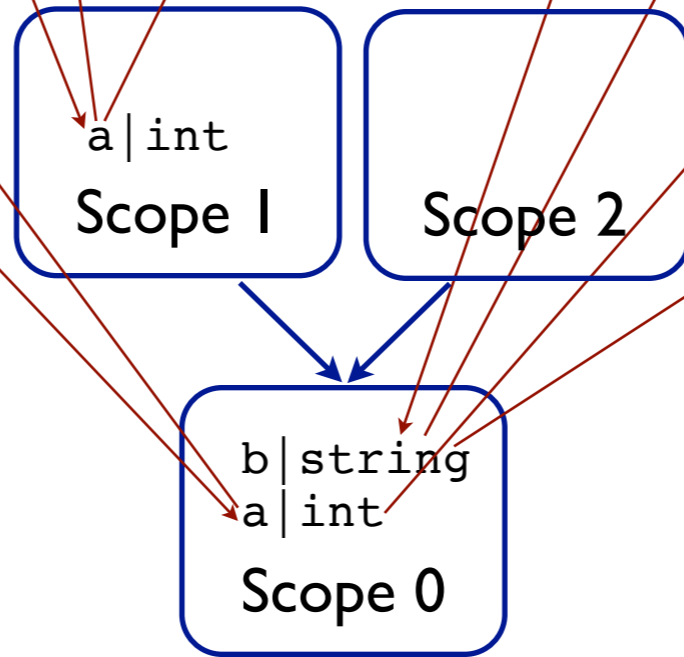
Symbol Table

AST



Source Code

```
{  
  int a@0:int  
  a@0:int = 1  
  {  
    int a@1:int  
    a@1:int = 2  
    print(a@1:int)  
  }  
  string b@0:string  
  b@0:string = "alan"  
  if (a@0:int == 1) {  
    print(b@0:string)  
  }  
}
```



Symbol Table

Source Code

```
{
  int a@0:int
  a@0:int = 1
  {
    int a@1:int
    a@1:int = 2
    print(a@1:int)
  }
  string b@0:string
  b@0:string = "alan"
  if (a@0:int == 1) {
    print(b@0:string)
  }
}
```

Runtime Environment

0								
8								
10								
18								
20								
28								
30								
38								
40								
48								
50								
58								

Make variable entries in **Static** table.



Static Data			
Temp	Var	Scope	Offset

Make entries in **Jump** table for **if** stmts.



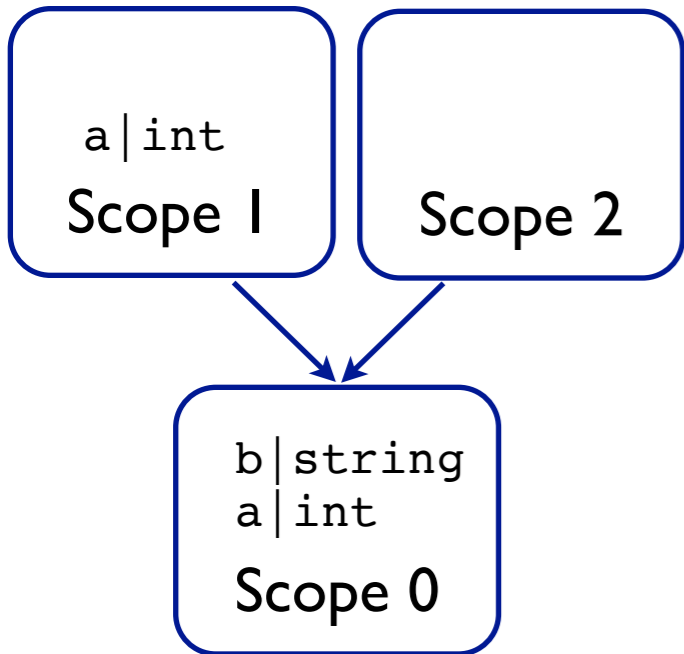
Jumps	
Temp	Dist

Source Code

```

{
  int a@0:int
  a@0:int = 1
  {
    int a@1:int
    a@1:int = 2
    print(a@1:int)
  }
  string b@0:string
  b@0:string = "alan"
  if (a@0:int == 1) {
    print(b@0:string)
  }
}

```



Runtime Environment

0								
8								
10								
18								
20								
28								
30								
38								
40								
48								
50								
58								

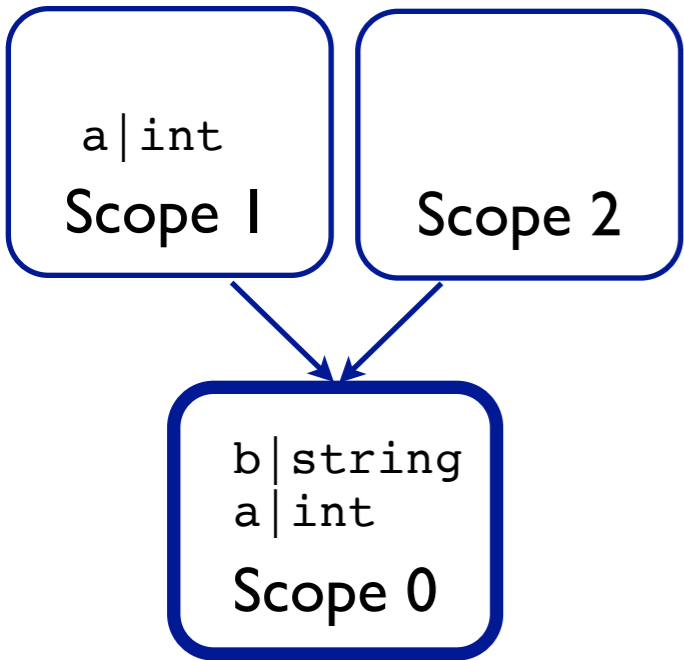
Static Data			
Temp	Var	Scope	Offset

Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}
    
```



Runtime Environment

0								
8								
10								
18								
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset

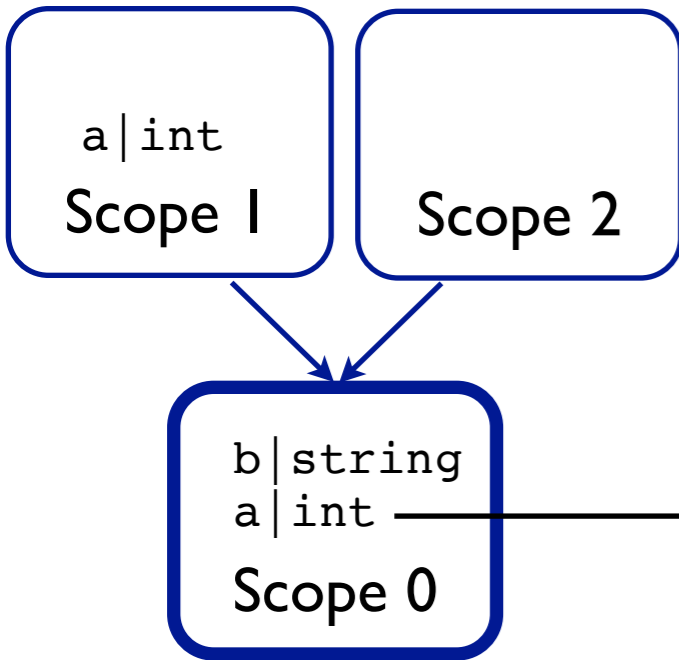
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX			
8								
10								
18								
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0

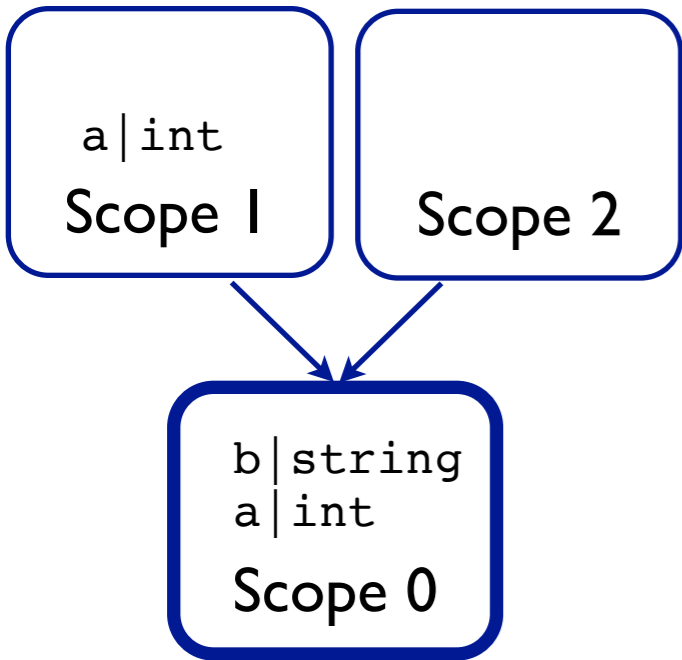
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX						
10								
18								
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0

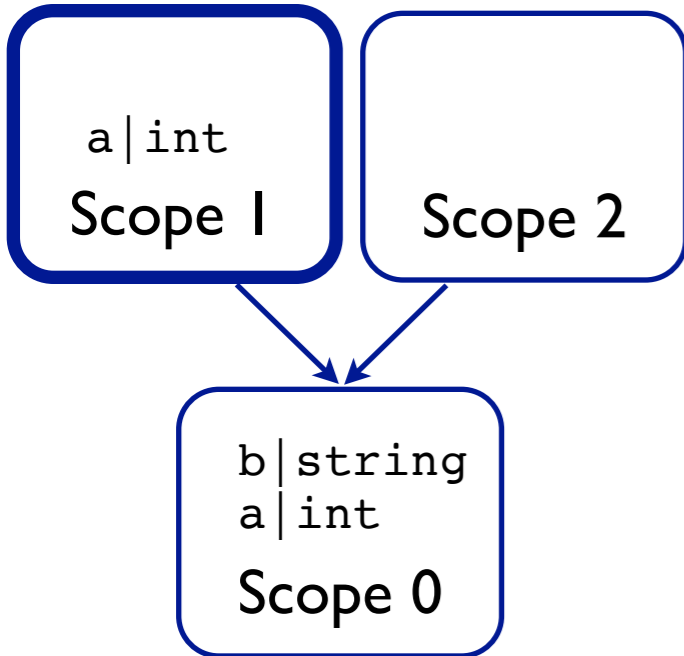
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX						
10								
18								
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0

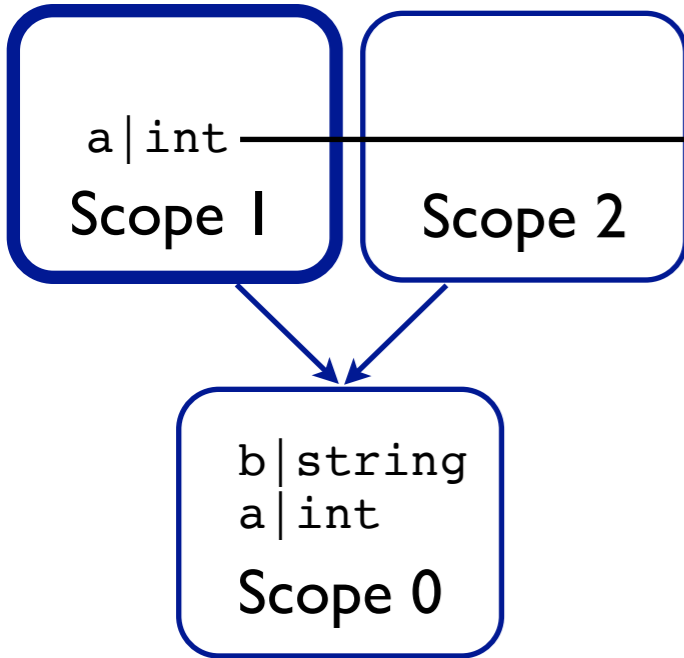
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	
10								
18								
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1

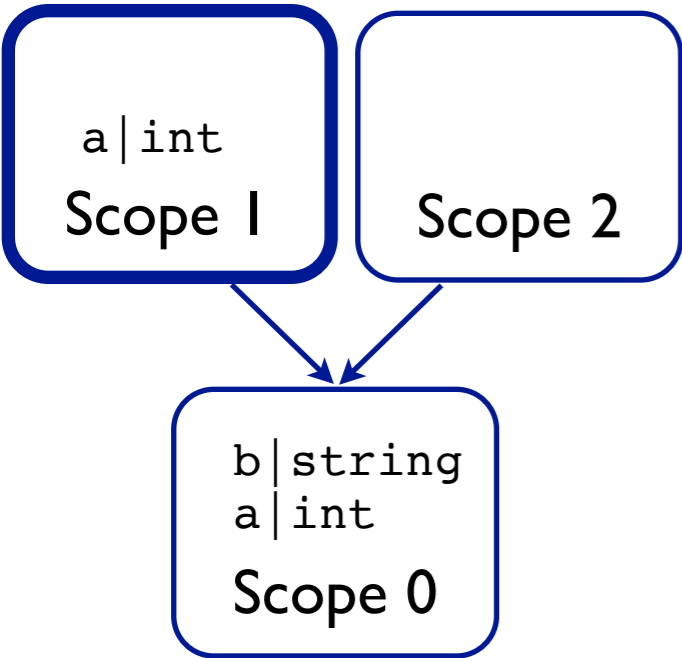
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX				
18								
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1

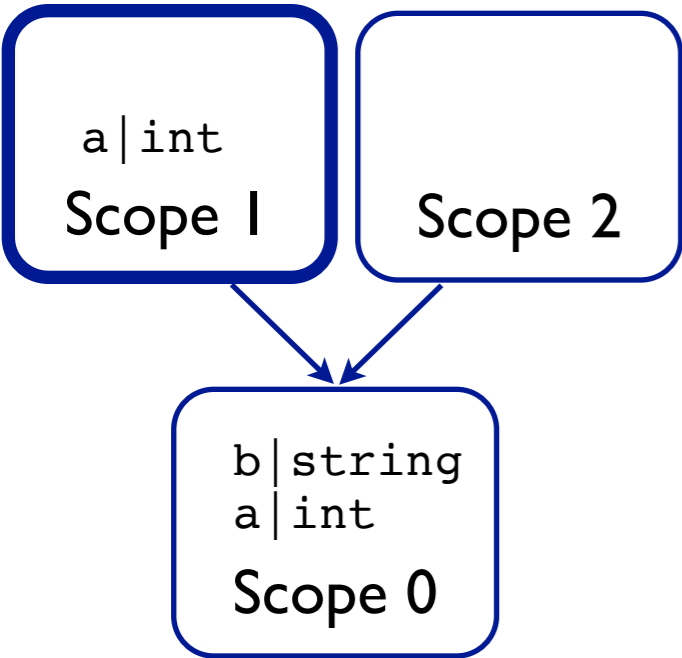
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF						
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1

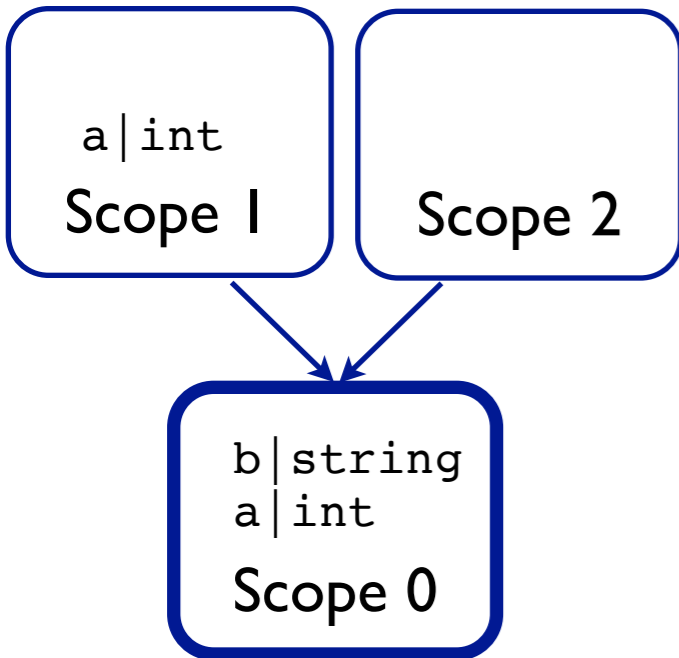
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF						
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1

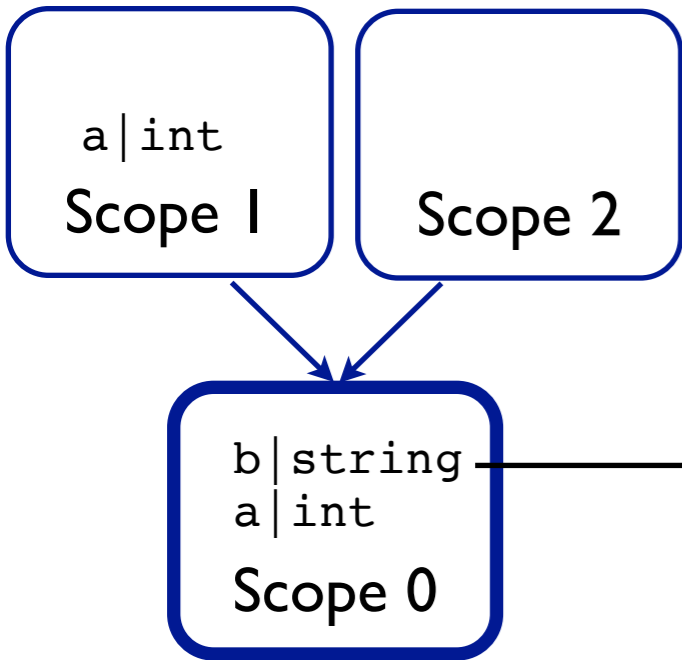
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Add a static pointer to the start of the string in the heap.

Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF						
20								
28								
30								
38								
40								
48								
50								
58								

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

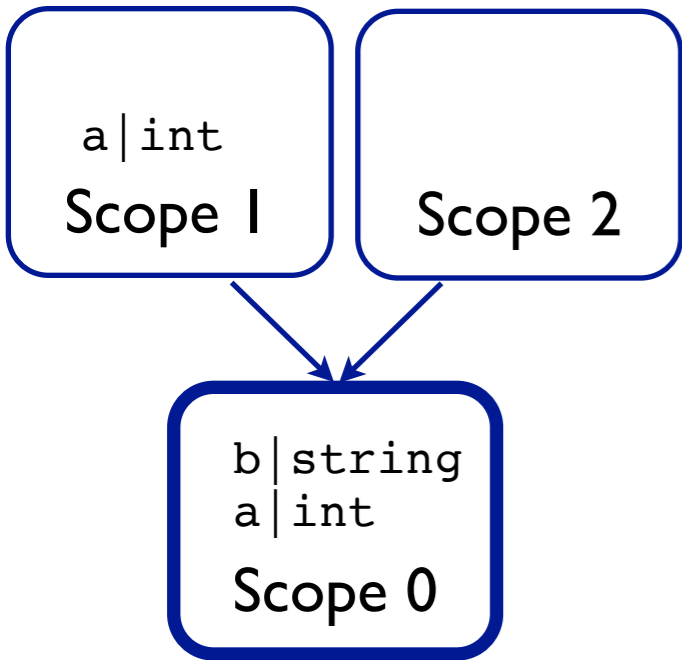
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Write the data into heap memory...

Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF						
20								
28								
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

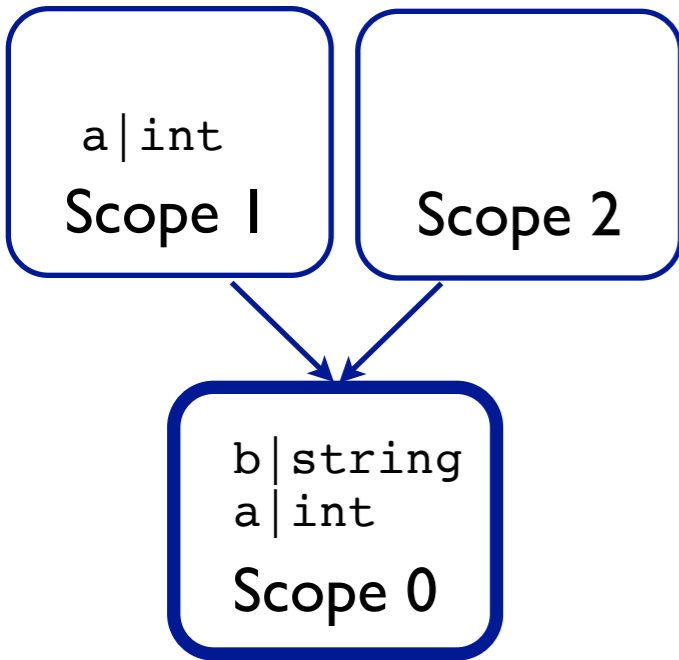
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Write the data into heap memory... then store the static pointer for b@0.

Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	
20								
28								
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

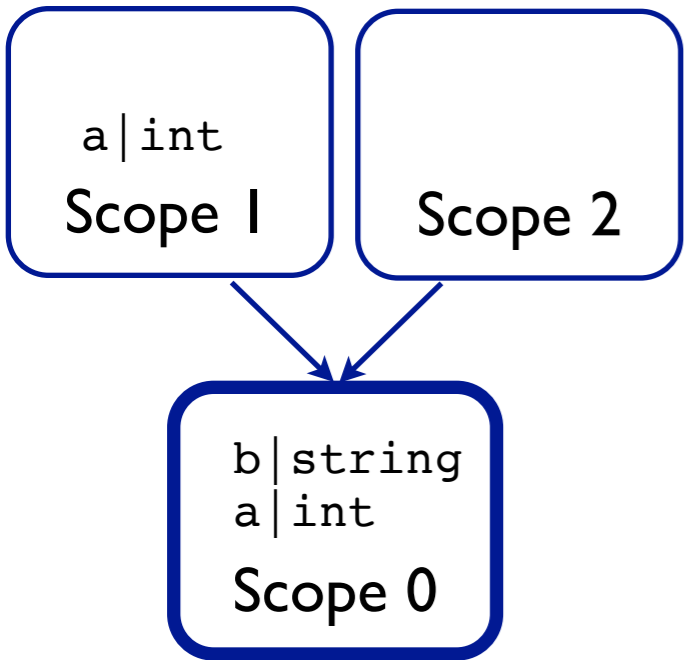
Jumps	
Temp	Dist

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0		
28								
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

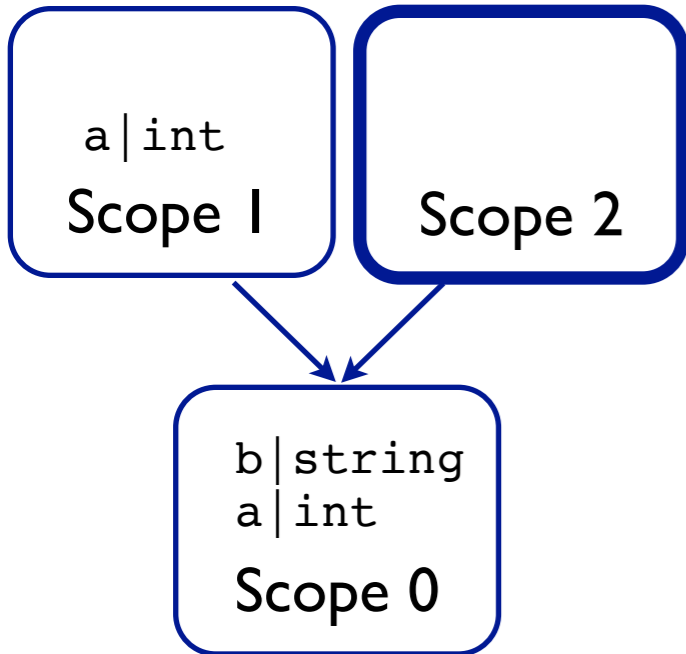
Jumps	
Temp	Dist
J0	?

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0		
28								
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

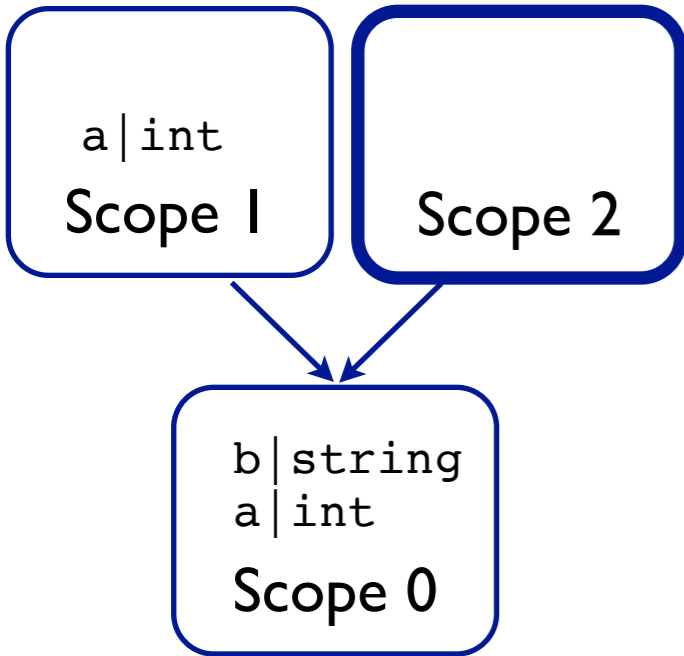
Jumps	
Temp	Dist
J0	?

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF				
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

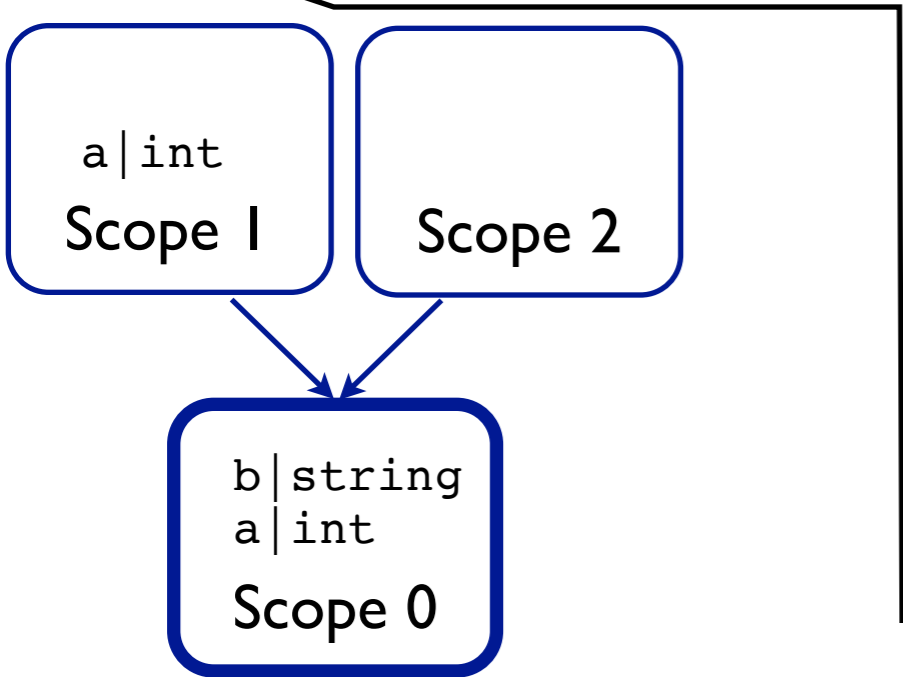
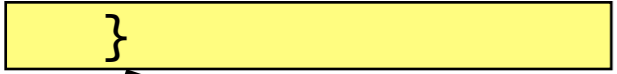
Jumps	
Temp	Dist
J0	?

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF				
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

Jumps	
Temp	Dist
J0	7

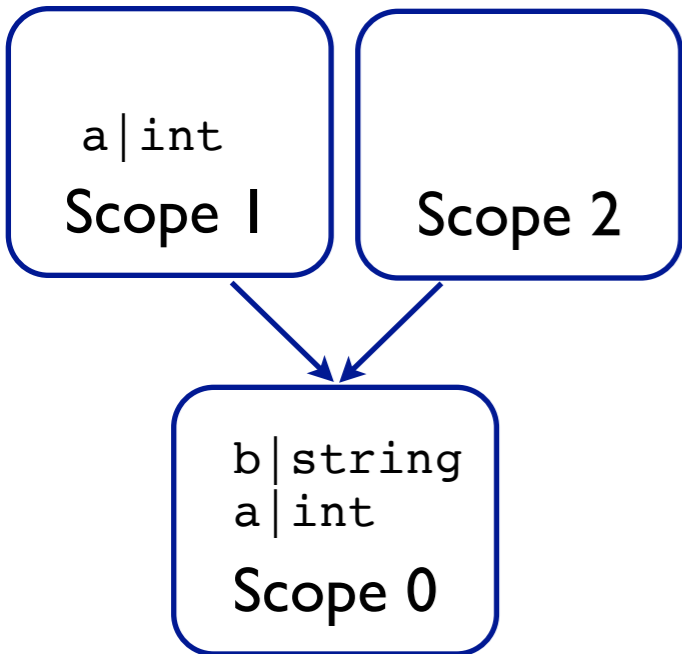
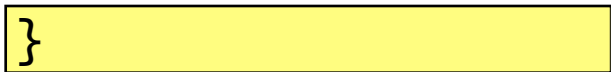


Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF	00			
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```

Backpatch temporary values:
Jump J0 → 07

Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	07	AC	T2
28	XX	A2	02	FF	00			
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```

Backpatch temporary values:
 Jump J0 → 07
T0 XX → 2D 00

Runtime Environment

0	A9	00	8D	2D	00	A9	01	8D
8	2D	00	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	2D	00	D0	07	AC	T2
28	XX	A2	02	FF	00	used a@0		
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
2D 00	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```

Backpatch temporary values:

Jump J0 → 07

T0 XX → 2D 00

T1 XX → 2E 00

Runtime Environment

0	A9	00	8D	2D	00	A9	01	8D
8	2D	00	A9	00	8D	2E	00	A9
10	02	8D	2E	00	AC	2E	00	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	2D	00	D0	07	AC	T2
28	XX	A2	02	FF	00	used a@0	used a@1	
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
2D 00	a	0	+0
2E 00	a	1	+1
T2XX	b↑	0	+2

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```

Backpatch temporary values:

Jump J0 → 07

T0 XX → 2D 00

T1 XX → 2E 00

T2 XX → 2F 00

Runtime Environment

0	A9	00	8D	2D	00	A9	01	8D
8	2D	00	A9	00	8D	2E	00	A9
10	02	8D	2E	00	AC	2E	00	A2
18	01	FF	A9	5B	8D	2F	00	A2
20	01	EC	2D	00	D0	07	AC	2F
28	00	A2	02	FF	00	used a@0	used a@1	used b↑@0
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
2D 00	a	0	+0
2E 00	a	1	+1
2F 00	b↑	0	+2

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```

Backpatch temporary values:

Jump J0 → 07

T0 XX → 2D 00

T1 XX → 2E 00

T2 XX → 2F 00

Fill the space with 00.

Runtime Environment

0	A9	00	8D	2D	00	A9	01	8D
8	2D	00	A9	00	8D	2E	00	A9
10	02	8D	2E	00	AC	2E	00	A2
18	01	FF	A9	5B	8D	2F	00	A2
20	01	EC	2D	00	D0	07	AC	2F
28	00	A2	02	FF	00	00	00	00
30	00	00	00	00	00	00	00	00
38	00	00	00	00	00	00	00	00
40	00	00	00	00	00	00	00	00
48	00	00	00	00	00	00	00	00
50	00	00	00	00	00	00	00	00
58	00	00	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
2D 00	a	0	+0
2E 00	a	1	+1
2F 00	b↑	0	+2

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```

Try it:

```

A9 00 8D 2D 00 A9 01 8D
2D 00 A9 00 8D 2E 00 A9
02 8D 2E 00 AC 2E 00 A2
01 FF A9 5B 8D 2F 00 A2
01 EC 2D 00 D0 07 AC 2F
00 A2 02 FF 00 00 00 00
00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00
00 00 00 61 6C 61 6E 00

```

Runtime Environment

0	A9	00	8D	2D	00	A9	01	8D
8	2D	00	A9	00	8D	2E	00	A9
10	02	8D	2E	00	AC	2E	00	A2
18	01	FF	A9	5B	8D	2F	00	A2
20	01	EC	2D	00	D0	07	AC	2F
28	00	A2	02	FF	00	00	00	00
30	00	00	00	00	00	00	00	00
38	00	00	00	00	00	00	00	00
40	00	00	00	00	00	00	00	00
48	00	00	00	00	00	00	00	00
50	00	00	00	00	00	00	00	00
58	00	00	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
2D 00	a	0	+0
2E 00	a	1	+1
2F 00	b↑	0	+2

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```

Now let's make it more complicated by

- adding another string
- changing the value of an existing string.

Rewind to just before the closing brace.

Runtime Environment

0	A9	00	8D	2D	00	A9	01	8D
8	2D	00	A9	00	8D	2E	00	A9
10	02	8D	2E	00	AC	2E	00	A2
18	01	FF	A9	5B	8D	2F	00	A2
20	01	EC	2D	00	D0	07	AC	2F
28	00	A2	02	FF	00	00	00	00
30	00	00	00	00	00	00	00	00
38	00	00	00	00	00	00	00	00
40	00	00	00	00	00	00	00	00
48	00	00	00	00	00	00	00	00
50	00	00	00	00	00	00	00	00
58	00	00	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
2D 00	a	0	+0
2E 00	a	1	+1
2F 00	b↑	0	+2

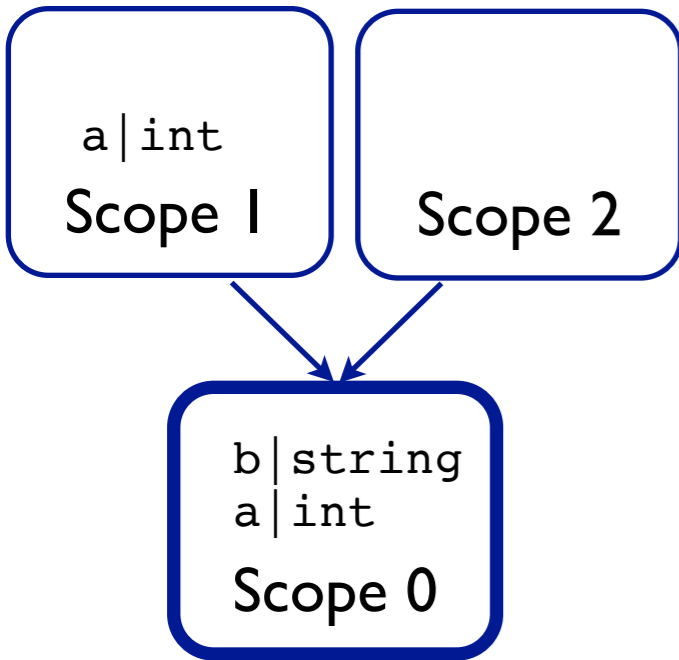
Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
}

```



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF				
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

Jumps	
Temp	Dist
J0	?

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```



c | string
 b | string
 a | int
 Scope 0

Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF				
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

Jumps	
Temp	Dist
J0	?

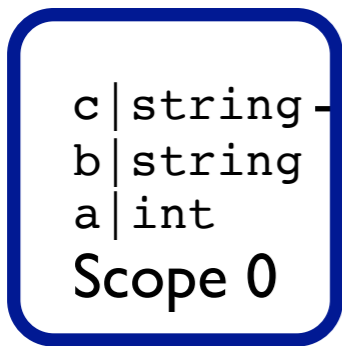
Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```

string c@0



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF				
30								
38								
40								
48								
50								
58				61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
T0XX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

More Static Data			
Temp	Var	Scope	Offset
T3XX	c↑	0	+3

Jumps	
Temp	Dist
J0	?

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```

Write the data into heap memory and then store the static pointer for c.

c		string
b		string
a		int
Scope 0		

Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF	A9	55	8D	T3
30	XX							
38								
40								
48								
50						6A	61	6D
58	65	73	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
T0XX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

More Static Data			
Temp	Var	Scope	Offset
T3XX	c↑	0	+3

Jumps	
Temp	Dist
J0	?

Source Code

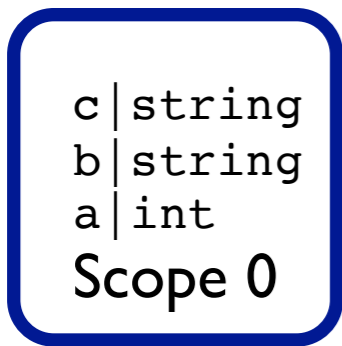
```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```

b@0 = "blackstone"

*Write the data into heap memory and then **update** the static pointer for b.*



Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF	A9	55	8D	T3
30	XX	A9	4A	8D	T2	XX		
38								
40								
48			62	6C	61	63	6B	73
50	74	6F	6E	65	00	6A	61	6D
58	65	73	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

More Static Data			
Temp	Var	Scope	Offset
T3XX	c↑	0	+3

Jumps	
Temp	Dist
J0	?

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```

print(b@0)

c | string
 b | string
 a | int
 Scope 0

Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF	A9	55	8D	T3
30	XX	A9	4A	8D	T2	XX	AC	T2
38	XX	A2	02	FF				
40								
48			62	6C	61	63	6B	73
50	74	6F	6E	65	00	6A	61	6D
58	65	73	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

More Static Data			
Temp	Var	Scope	Offset
T3XX	c↑	0	+3

Jumps	
Temp	Dist
J0	?

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```

c | string
 b | string
 a | int
 Scope 0

Runtime Environment

0	A9	00	8D	T0	XX	A9	01	8D
8	T0	XX	A9	00	8D	T1	XX	A9
10	02	8D	T1	XX	AC	T1	XX	A2
18	01	FF	A9	5B	8D	T2	XX	A2
20	01	EC	T0	XX	D0	J0	AC	T2
28	XX	A2	02	FF	A9	55	8D	T3
30	XX	A9	4A	8D	T2	XX	AC	T2
38	XX	A2	02	FF	00			
40								
48			62	6C	61	63	6B	73
50	74	6F	6E	65	00	6A	61	6D
58	65	73	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
TOXX	a	0	+0
T1XX	a	1	+1
T2XX	b↑	0	+2

More Static Data			
Temp	Var	Scope	Offset
T3XX	c↑	0	+3

Jumps	
Temp	Dist
J0	?

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```

Backpatch temporary values:

- Jump J0 → 07
- T0 XX → 3D 00
- T1 XX → 3E 00
- T2 XX → 3F 00
- T3 XX → 40 00

Runtime Environment

0	A9	00	8D	3D	00	A9	01	8D
8	3D	00	A9	00	8D	3E	00	A9
10	02	8D	3E	00	AC	3E	00	A2
18	01	FF	A9	5B	8D	3F	00	A2
20	01	EC	3D	00	D0	07	AC	3F
28	00	A2	02	FF	A9	55	8D	40
30	00	A9	4A	8D	3F	00	AC	3F
38	00	A2	02	FF	00	used a@0	used a@1	used b↑@0
40	used c↑@0							
48			62	6C	61	63	6B	73
50	74	6F	6E	65	00	6A	61	6D
58	65	73	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
3D 00	a	0	+0
3E 00	a	1	+1
3F 00	b↑	0	+2

More Static Data			
Temp	Var	Scope	Offset
40 00	c↑	0	+3

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```

Fill space with 00.

Runtime Environment

0	A9	00	8D	3D	00	A9	01	8D
8	3D	00	A9	00	8D	3E	00	A9
10	02	8D	3E	00	AC	3E	00	A2
18	01	FF	A9	5B	8D	3F	00	A2
20	01	EC	3D	00	D0	07	AC	3F
28	00	A2	02	FF	A9	55	8D	40
30	00	A9	4A	8D	3F	00	AC	3F
38	00	A2	02	FF	00	00	00	00
40	00	00	00	00	00	00	00	00
48	00	00	62	6C	61	63	6B	73
50	74	6F	6E	65	00	6A	61	6D
58	65	73	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
3D 00	a	0	+0
3E 00	a	1	+1
3F 00	b↑	0	+2

More Static Data			
Temp	Var	Scope	Offset
40 00	c↑	0	+3

Jumps	
Temp	Dist
J0	7

Source Code

```

{
  int a@0
  a@0 = 1
  {
    int a@1
    a@1 = 2
    print(a@1)
  }
  string b@0
  b@0 = "alan"
  if (a@0 == 1) {
    print(b@0)
  }
  string c@0
  c@0 = "james"
  b@0 = "blackstone"
  print(b@0)
}

```

Try it:

```

A9 00 8D 3D 00 A9 01 8D 3D 00 A9 00
8D 3E 00 A9 02 8D 3E 00 AC 3E 00 A2
01 FF A9 5B 8D 3F 00 A2 01 EC 3D 00
D0 07 AC 3F 00 A2 02 FF A9 55 8D 40
00 A9 4A 8D 3F 00 AC 3F 00 A2 02 FF
00 00 00 00 00 00 00 00 00 00 00 00
00 00 62 6C 61 63 6B 73 74 6F 6E 65
00 6A 61 6D 65 73 00 61 6C 61 6E 00

```

Runtime Environment

0	A9	00	8D	3D	00	A9	01	8D
8	3D	00	A9	00	8D	3E	00	A9
10	02	8D	3E	00	AC	3E	00	A2
18	01	FF	A9	5B	8D	3F	00	A2
20	01	EC	3D	00	D0	07	AC	3F
28	00	A2	02	FF	A9	55	8D	40
30	00	A9	4A	8D	3F	00	AC	3F
38	00	A2	02	FF	00	00	00	00
40	00	00	00	00	00	00	00	00
48	00	00	62	6C	61	63	6B	73
50	74	6F	6E	65	00	6A	61	6D
58	65	73	00	61	6C	61	6E	00

Static Data			
Temp	Var	Scope	Offset
3D 00	a	0	+0
3E 00	a	1	+1
3F 00	b↑	0	+2

More Static Data			
Temp	Var	Scope	Offset
40 00	c↑	0	+3

Jumps	
Temp	Dist
J0	7