

Chapter 0

Exercises

Course “Compiler Construction”

Martin Steffen

Spring 2022



Section

Exercises 07

7.1: C RTE & scoping
7.2: Pascal RTE & access links
7.3: Display
7.4: VFT & memory layout for classes
7.5: Parameter passing (1)
7:6. Paramter passing (2): swap

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7.1: Program

```
1  int a[10];
2  char * s = "hello";
3
4  int f(int i, int b[])
5  { int j=i;
6   A:{ int i=j;
7       char c = b[i];
8       //...;
9     }
10    return 0;
11 }
12
13 void g(char * s)
14 { char c = s[0];
15  B:{ int a[5];
16      // ...;
17    }
18 }
19
20 main ()
21 { int x=1;
22   x = f(x,a);
23   g(s);
24   return 0;
25 }
```





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7.2: Pascal program: control and access links

```
1  program env;
2
3  procedure a;
4  var x: integer;
5
6     procedure b;
7        procedure c;
8        begin
9           x := 2;
10          b;
11       end;
12    begin (* b *)
13       c;
14    end;
15
16 begin (* a *)
17    b;
18 end;
19
20 begin (* main *)
21    a;
22 end.
```



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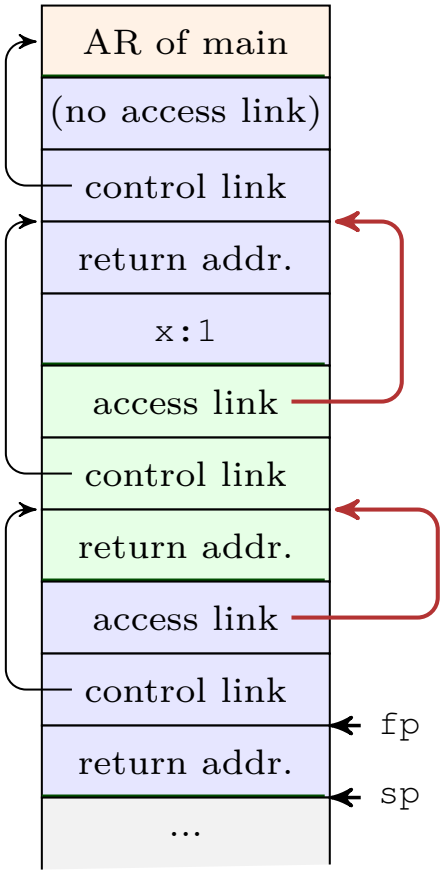
7.3: Display

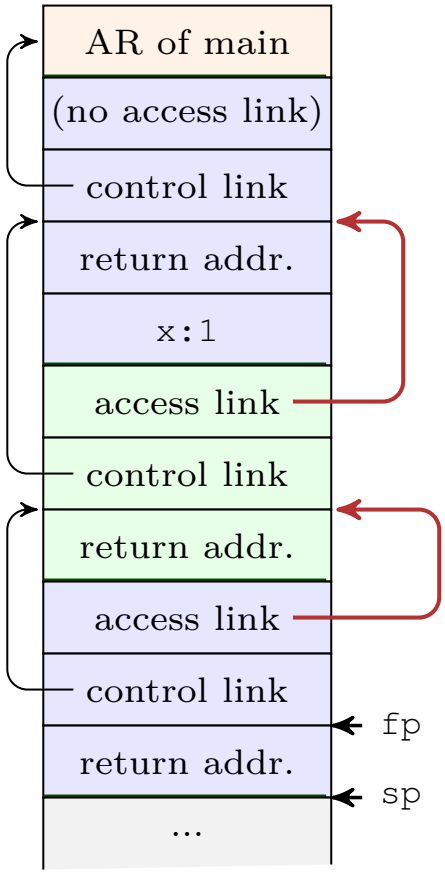
7.4: VFT & memory layout for classes

7.5: Parameter passing (1)

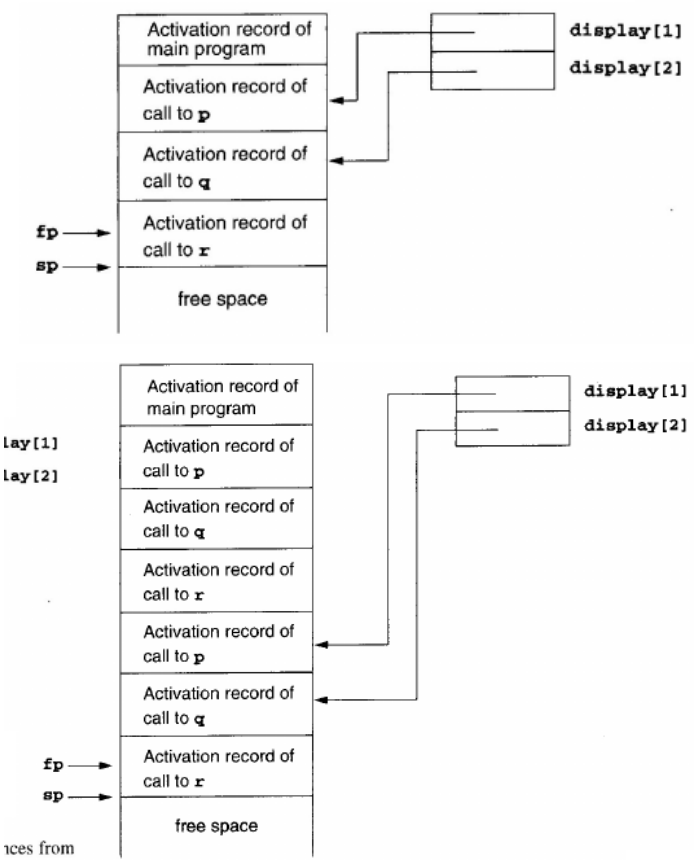
7:6. Paramter passing (2): swap

7.3: Run-time stacks without display (cf. lecture)





7.3: Run-time stacks with display





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7.4: C++ kind of class defs

```
1  class A
2  { public:
3    int a;
4    virtual void f();
5    virtual void g();
6  };
7
8  class B : public A
9  { public:
10   int b;
11   virtual void f();
12   void h();
13 };
14
15
16 class C: public B
17 { public:
18   int c;
19   virtual void g();
20 }
```



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7.5. Example

```
1  #include <stdio.h>
2  int i = 0;
3
4  void p(int x, int y)
5  { x += 1;
6    i += 1;
7    y += 1;
8  }
9
10 main ()
11 { int a[2] = {1,1};
12   p(a[i],a[i]);
13   printf("%d %d\n",a[0], a[1]);
14   return 0;
15 }
```





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7.6: Example: swap

```
1  #include <stdio.h>
2  int i = 0;
3
4  void swap (int x, int y)
5  {
6     x = x + y;
7     y = x - y;
8     x = x - y;
9  }
10
11 main ()
12 { int a[3] = {1,2,0};
13    swap(i,a[i]);
14    printf("%d %d %d %d\n",i,a[0], a[1],a[2]);
15    return 0;
16 }
```



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