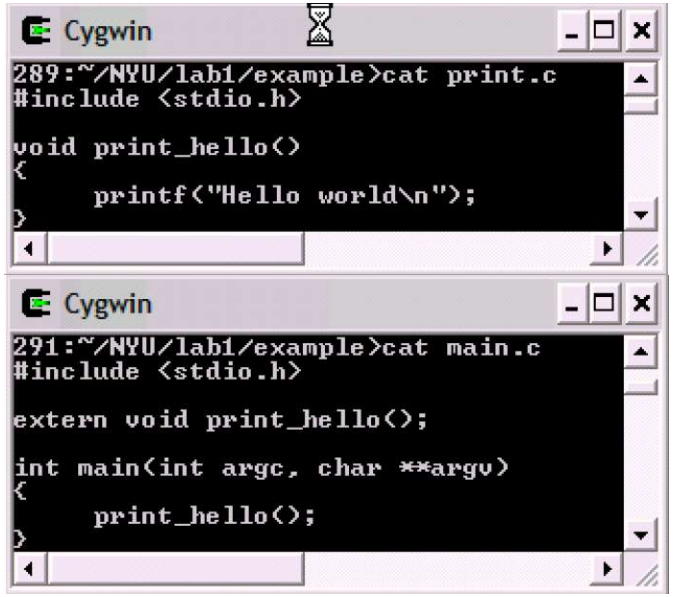
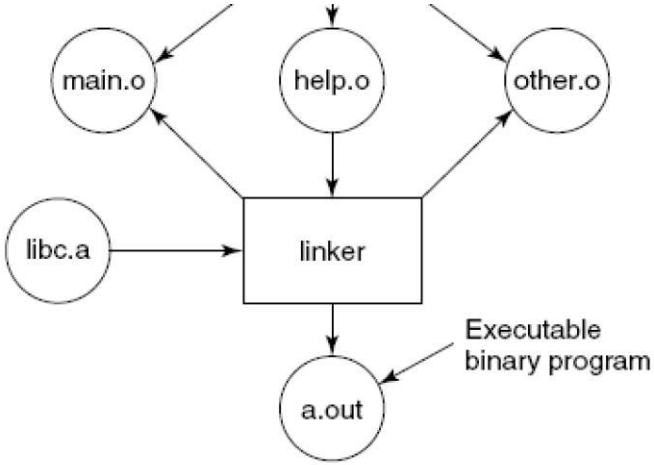
LAB assignment #1

LAB #1: Write a Linker

- Link "==merge" together multiple parts of a program

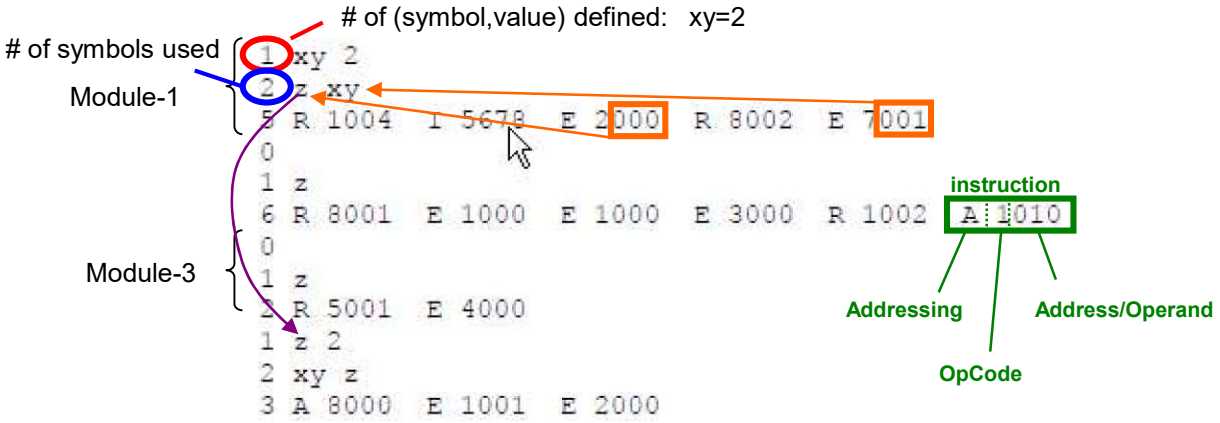
- What problem is solved?
  - External references need to be resolved
  - Module relative addressing needs to be fixed





LAB #1: Write a Linker

- Simplified module specification
  - List of symbols defined and their value by module
  - List of symbols used in module (including external)
  - List of "instructions"



Addressing

I: Immediate
R: Relative
A: Absolute
E: External

Lab #1: Write a Linker

input

```
1 xy 2
2 z xy
5 R 1004  I 5678  E 2000  R 8002  E 7001
0
1 z
6 R 8001  E 1000  E 1000  E 3000  R 1002  A 1010
0
1 z
2 R 5001  E 4000
1 z 2
2 xy z
3 A 8000  E 1001  E 2000
```

Fancy Output (not req)

```
Symbol Table
xy=2
z=15
Memory Map
+0
0:       R 1004          1004+0 =  1004
1:       I 5678                    5678
2: xy:   E 2000 ->z                2015
3:       R 8002          8002+0 =  8002
4:       E 7001 ->xy               7002
+5
0:       R 8001          8001+5 =  8006
1:       E 1000 ->z                1015
2:       E 1000 ->z                1015
3:       E 3000 ->z                3015
4:       R 1002          1002+5 =  1007
5:       A 1010                    1010
+11
0:       R 5001          5001+11=  5012
1:       E 4000 ->z                4015
+13
0:       A 8000                    8000
1:       E 1001 ->z                1015
2 z:     E 2000 ->xy               2002
```

Required output

```
Symbol Table
xy=2
z=15
Memory Map
000: 1004
001: 5678
002: 2015
003: 8002
004: 7002
005: 8006
006: 1015
007: 1015
008: 3015
009: 1007
010: 1010
011: 5012
012: 4015
013: 8000
014: 1015
015: 2002
```