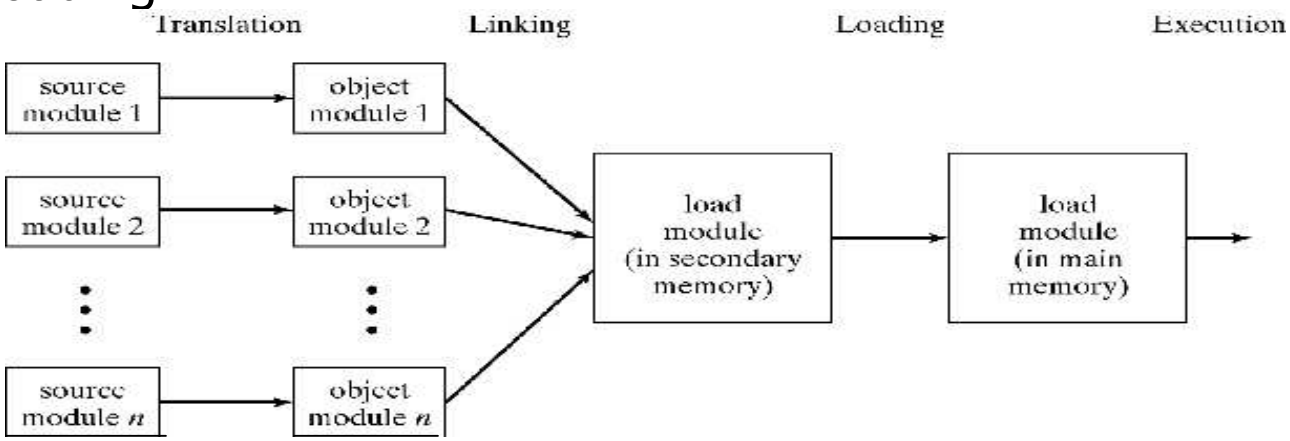
Miscellaneous Memory Management topics

Preparing Program for Execution

- Discussion taken from "Operating Systems Principles", Bic and Shaw, Prentice Hall, 2003.
- Program Transformations
  - Translation (Compilation)
  - Linking
  - Loading

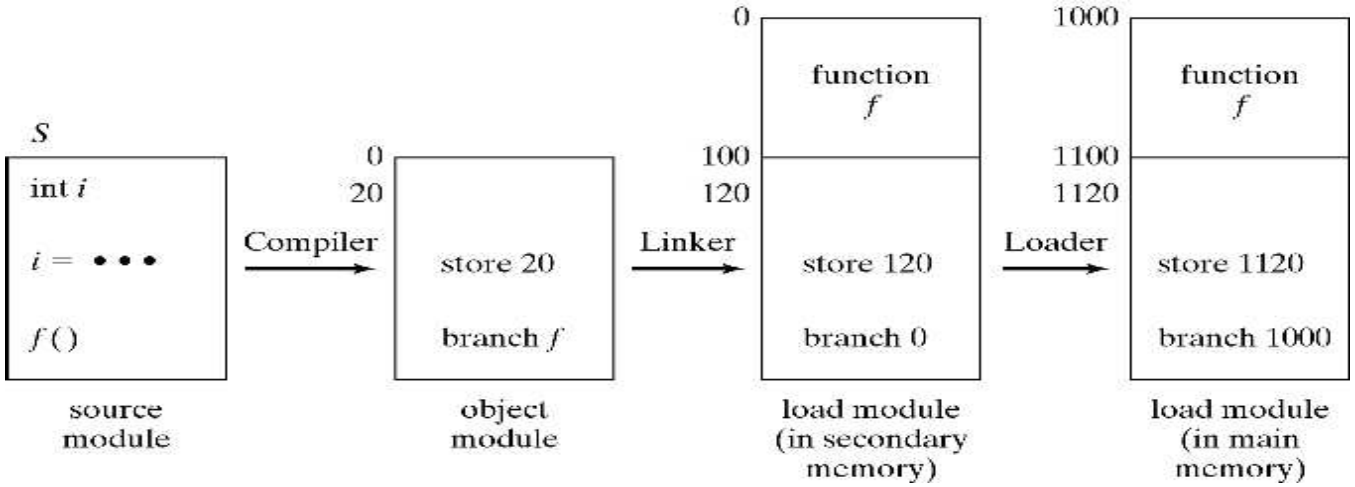


Address Binding

- Assign Physical Addresses = Relocation
- Static binding
  - Programming time
  - Compilation time
  - Linking time
  - Loading time
- Dynamic binding
  - Execution time

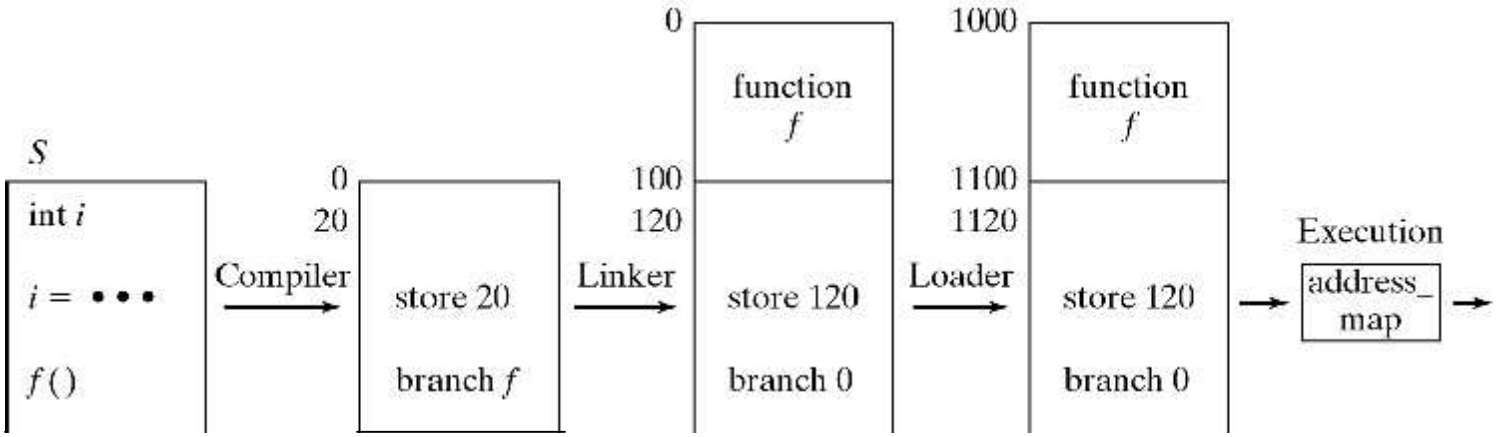
Static Address Binding

Static Binding = At Programming, Compilation, Linking, and/or Loading Time



Dynamic Address Binding

Dynamic Binding = At Execution Time



Address Binding

- How to implement dynamic binding
  - Perform for each address at run time:

    `pa = address_map(la)`

  - Simplest form of **`address_map`**:
    Relocation Register: **`pa = la + RR`**

  - More general form:
    Page/Segment Table

Third-chance algorithm

- Second chance algorithm does not distinguish between read and write access
- Write access more expensive
- Give modified pages a third chance:
  - ***u***-bit set at every reference (read and write)
  - ***w***-bit set at write reference
  - to select a page, cycle through frames, resetting bits, until ***uw==00***:

uw →	uw	
1 1	0 1	
1 0	0 0	
0 1	0 0 *	(remember modification)
0 0	select	

Third-chance algorithm

- Read–>10–>00–>Select
  Write–>11–>01–>00*–>Select

...	0	1	2	3	4	5	6	7	8	9	10	.
…		c	a^w	d	b^w	e	b	a^w	b	c	d	.
	>a/10	>a/10	>a/11	>a/11	>a/11	a/00*	a/00*	a/11	a/11	>a/11	a/00*	
…	b/10	b/10	b/10	b/10	b/11	b/00*	b/10*	b/10*	b/10*	b/10*	d/10	
…	c/10	c/10	c/10	c/10	c/10	e/10	e/10	e/10	e/10	e/10	>e/00	
…	d/10	d/10	d/10	d/10	d/10	>d/00	>d/00	>d/00	>d/00	c/10	c/00	.
…	IN					e				c	d	
…	OUT					c				d	b	