TAIPEI TECH 國立臺北科技大學 National Taipei University of Technology

Department of Computer Science and Information Engineering

Object Oriented Programming

Lecture 03: Runtime Model of Program

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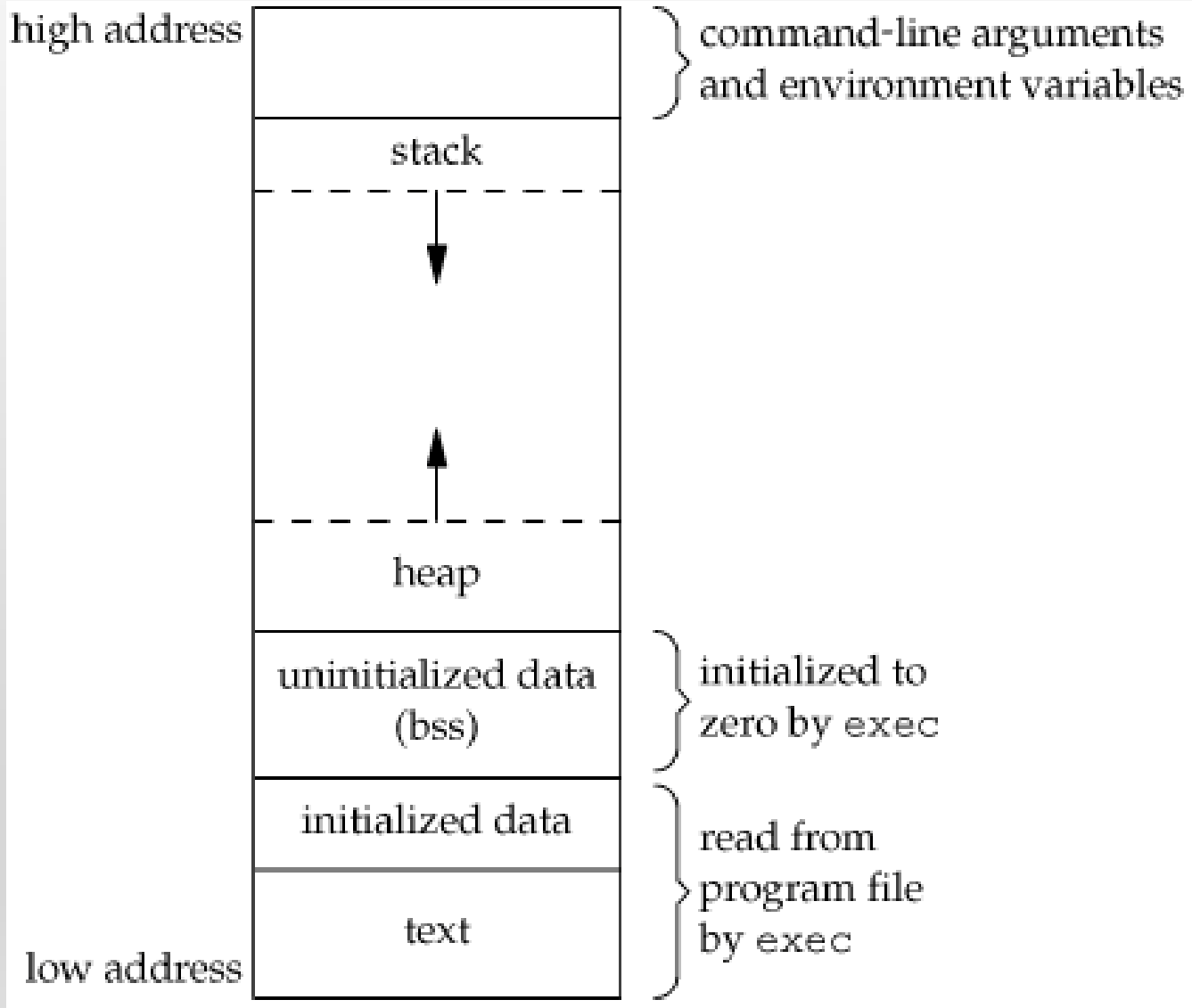
The Sixth Teaching Building 327
M 15:10 - 16:00 & F 10:10 - 12:00

Memory Model

- Normally, the memory model of a program consists of
  - Text segment
  - Initialized data segment
  - Uninitialized data segment
  - Stack
  - Heap



Text segment

- Code segment
- Made of compiled source code and executable instructions
- At low address to avoid being overwritten by stack & heap
- Sharable between process
- Read-only

Initialized Data Segment

- Global Variable/Static Variable
  - Read-Only Segment
  - Read-Write Segment

```
(global) int a = 1; //Read-Write

const int a = 1; //Read-Only
```

Uninitialized Data Segment

- Also known as Block started by symbol = bss segment
- Global and static variable with no initialization or initialized to 0

```
static int i; //BSS segment

static int j = 0; //BSS segment
```

Stack

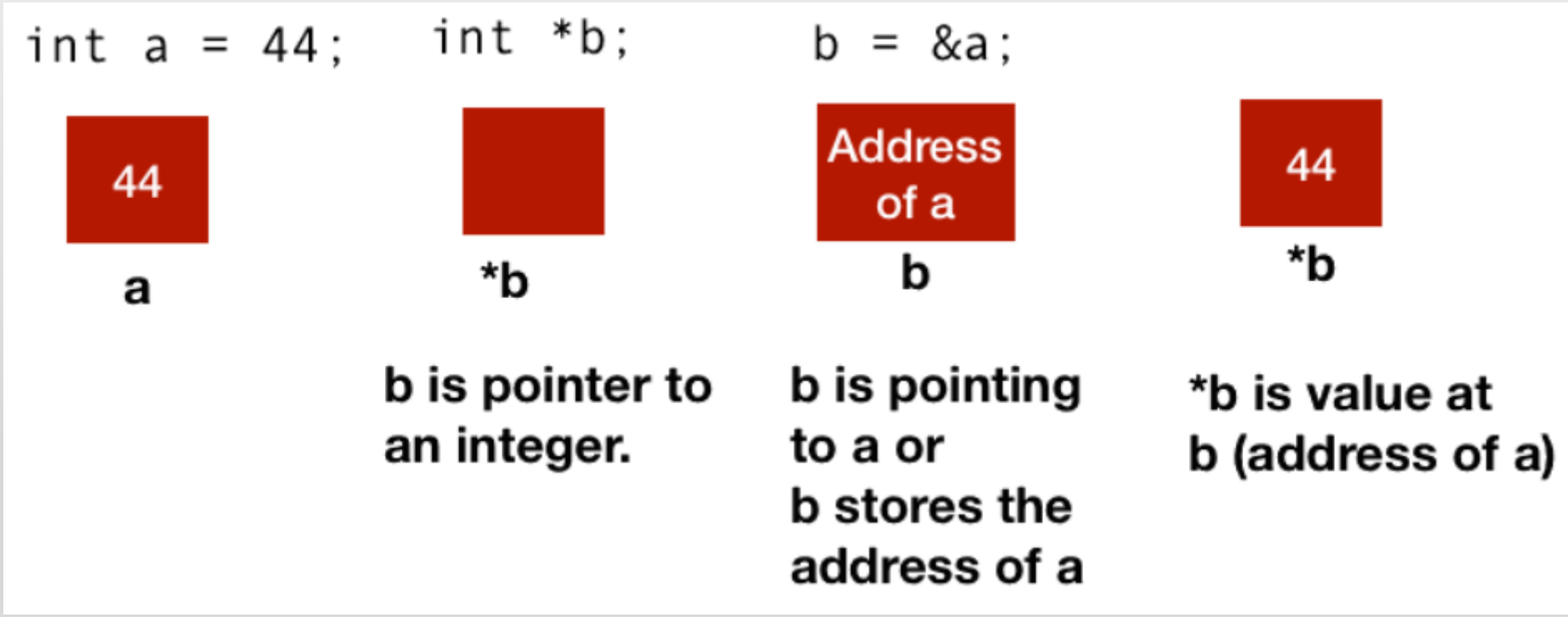
- Store Automatic Variables, such local variable in function
- Record the stack condition (i.e., caller address) of functions
- Each thread has their own stack

Heap

- Dynamically allocable memory
  - malloc/realloc/new/free
- Out of memory when pointer collision happens between heap and stack
- All threads share a common Heap.

Pointer in C

```
int a = 44;
int *b; /* declaration of pointer b */
b = &a;
```



Q & A

Thank you for your attention.