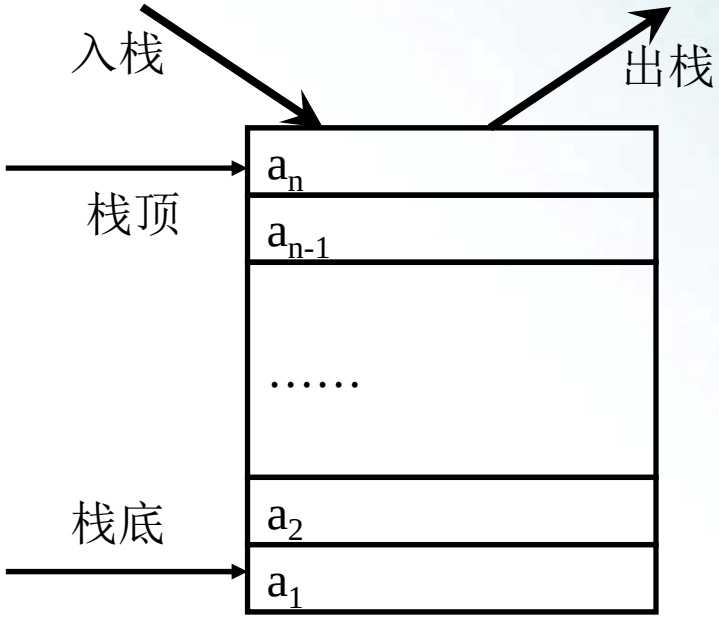
栈的定义

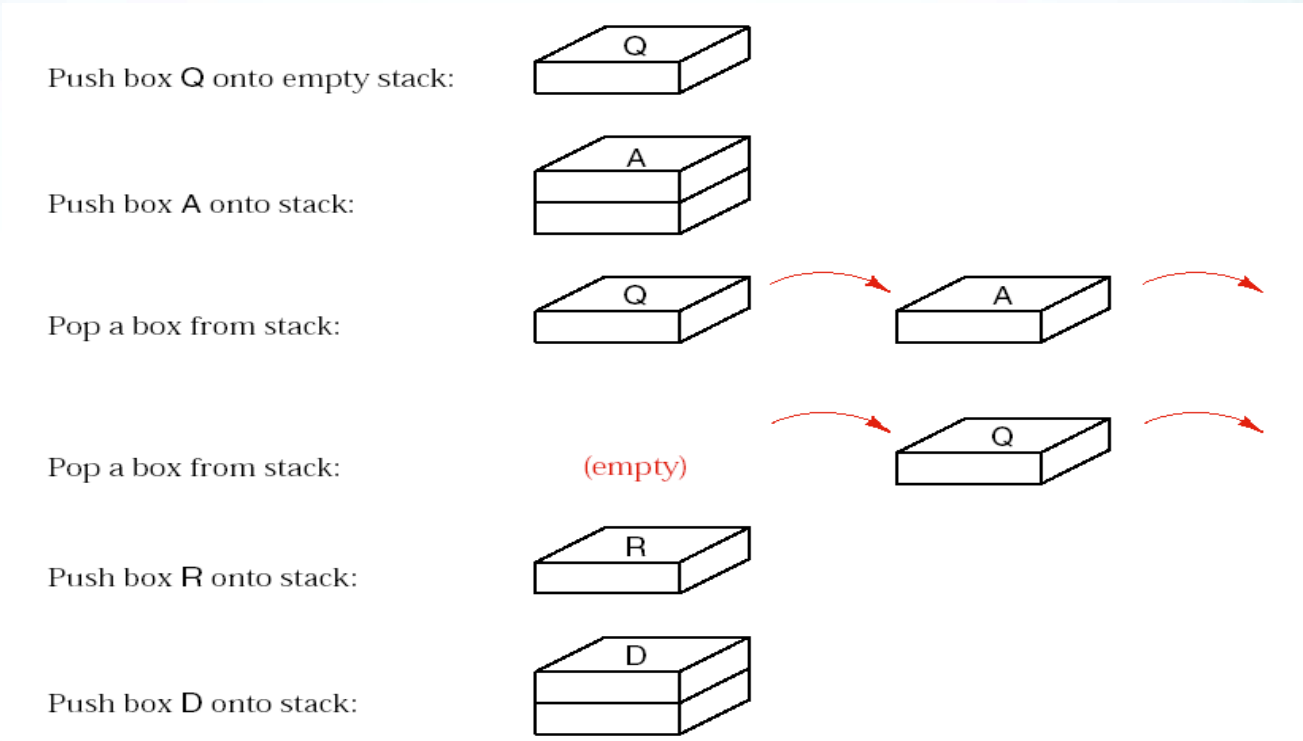
栈的抽象数据类型（ADT）

- 定义：特殊的线性表。插入、删除动作限定在线性表的一端（即：栈顶）
- 基本操作：
  - 初始化生成空栈：**stack**
  - 判栈是否为空：**empty**
  - 入栈：**push**
  - 出栈：**pop**
  - 取栈顶元素：**top**



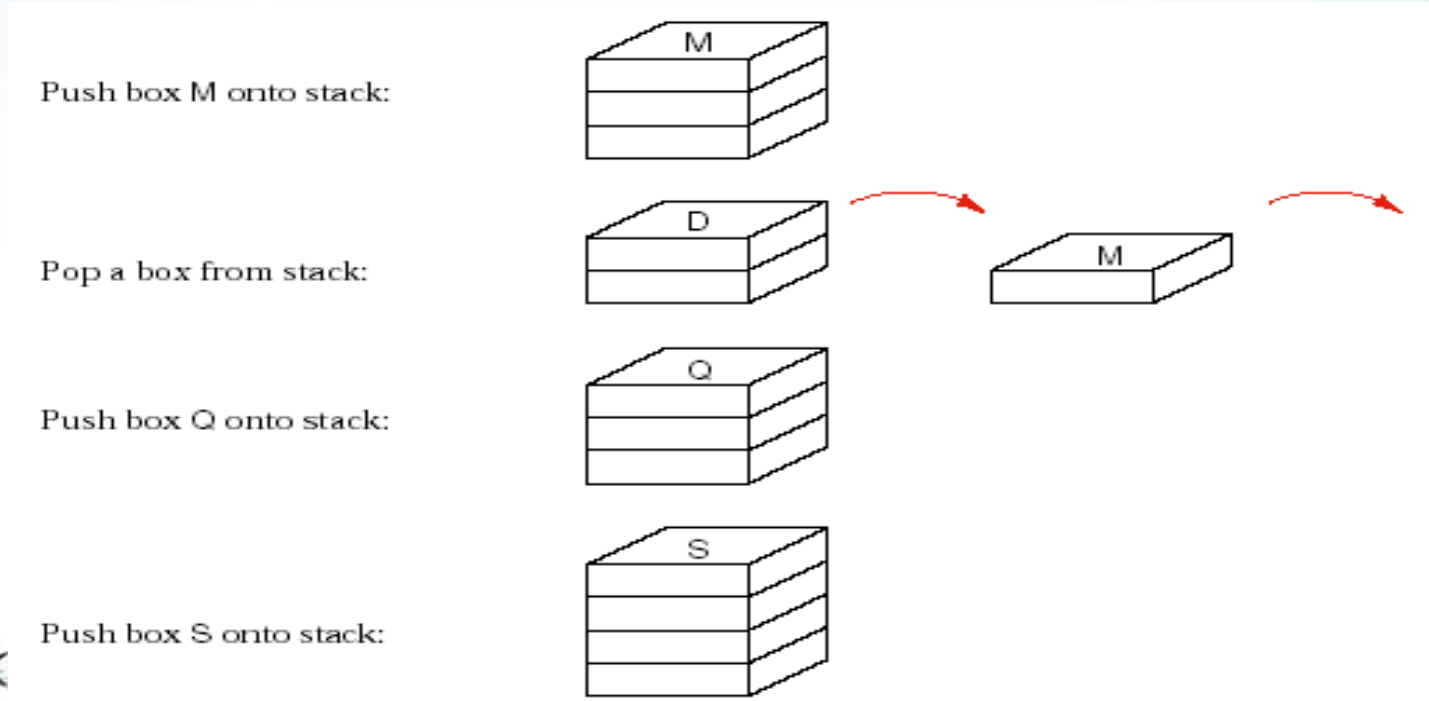
栈的ADT

- 出入栈操作示例：



栈的ADT

- 出入栈操作示例：



栈的定义

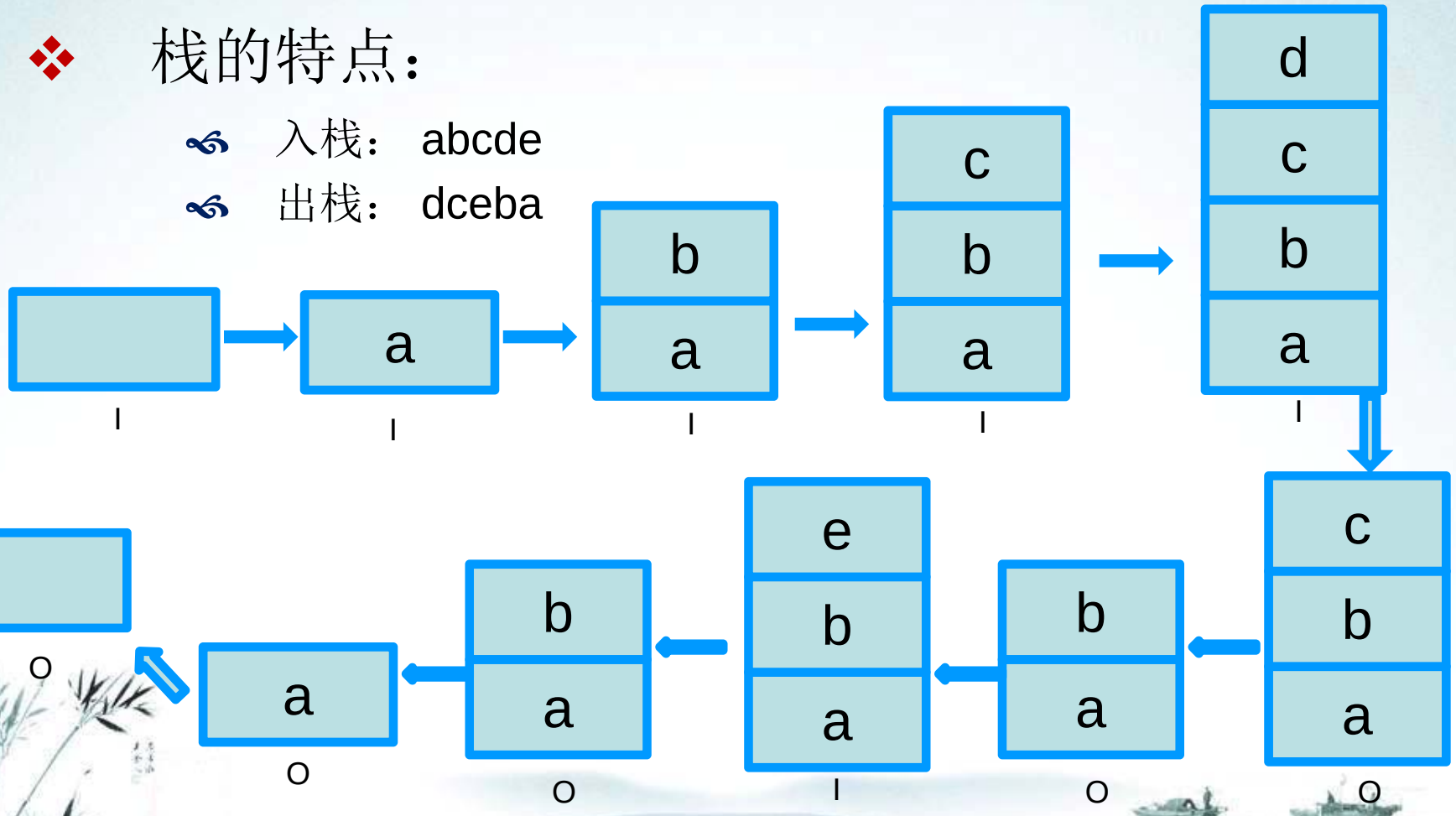
- 栈的特点：
  - 先进后出（**FILO**）或者 后进先出（**LIFO**）

（The last item pushed into a stack is always the first one which will be popped from the stack. ）

  - 但不排除后者未进栈之前，先入栈者先出栈的情况
    - 例：假设有 5 个元素abcde顺序进栈（进栈过程中可以出栈），出栈序列为dceba，则该栈容量必定不小于多少？

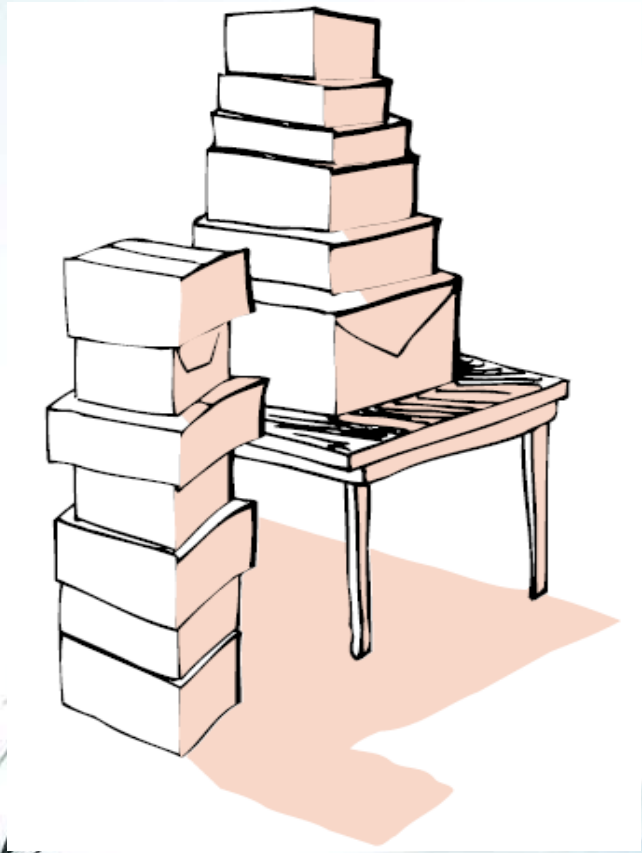
栈的定义

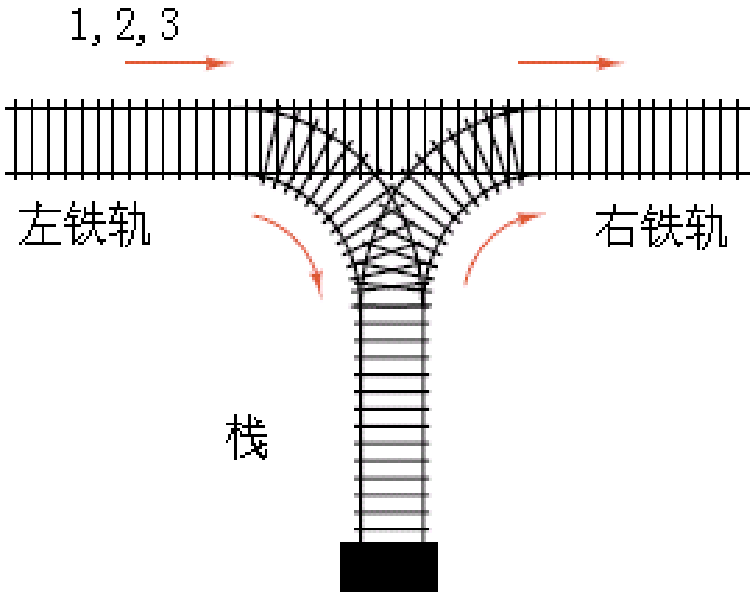
- 栈的特点：
  - 入栈： abcde
  - 出栈： dceba



栈的定义

- 栈的应用实例：





栈的ADT

- 栈基本操作的规范说明（Specification）：
  - 初始化生成空栈：

```
Stack::Stack();
Pre:  None.
Post: The Stack exists and is initialized to be empty.
```

栈的定义

- 栈基本操作的规范说明（Specification）：
  - 入栈：

Error_code Stack **::** push(**const** Stack_entry &item);
pre: None.
post: If the Stack is not full, item is added to the top of the Stack. If the Stack is full, an Error_code of overflow（上溢） is returned and the Stack is left unchanged.

栈的定义

- 栈基本操作的规范说明（Specification）：
  - 出栈：

Error_code Stack :: pop( );
pre: None.
post: If the Stack is not empty, the top of the Stack is removed. If the Stack is empty, an Error_code of underflow（下溢） is returned and the Stack is left unchanged.

栈的定义

- 栈基本操作的规范说明（Specification）：
  - 取栈顶元素：

Error_code Stack **::** top(Stack_entry &item) **const;**
precondition: None.
postcondition: The top of a nonempty Stack is copied to item. A code of fail is returned if the Stack is empty.

栈的定义

- 栈基本操作的规范说明（Specification）：
  - 判断栈空：

bool Stack **::** empty( ) **const;**
precondition: None.
postcondition: A result of **true** is returned if the Stack is empty, otherwise **false** is returned.