

向量

抽象数据类型：模板类

02-A3

官职须由生处有，文章不管用时无
堪笑翰林陶学士，年年依样画葫芦

邓俊辉

deng@tsinghua.edu.cn

```
template <typename T> class Vector { //向量模板类
```

```
private: Rank _size; Rank _capacity; T* _elem; //规模、容量、数据区
```

```
protected:
```

```
/* ... 内部函数 */
```

```
public:
```

```
/* ... 构造函数 */
```

```
/* ... 析构函数 */
```

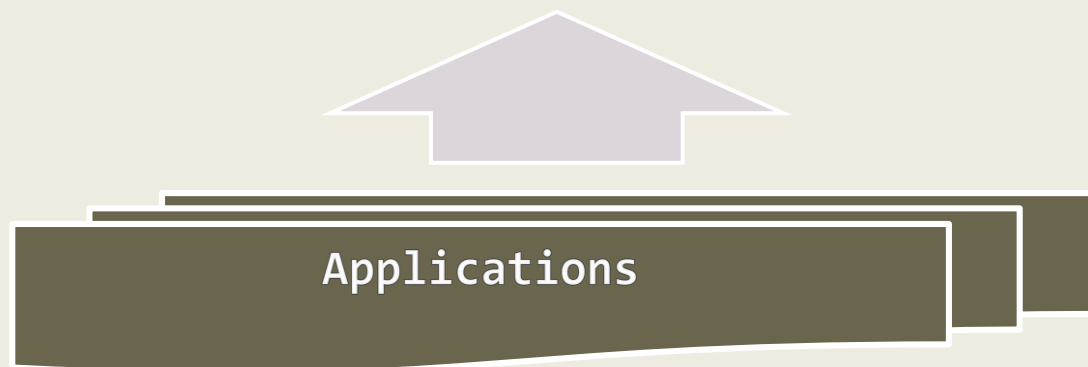
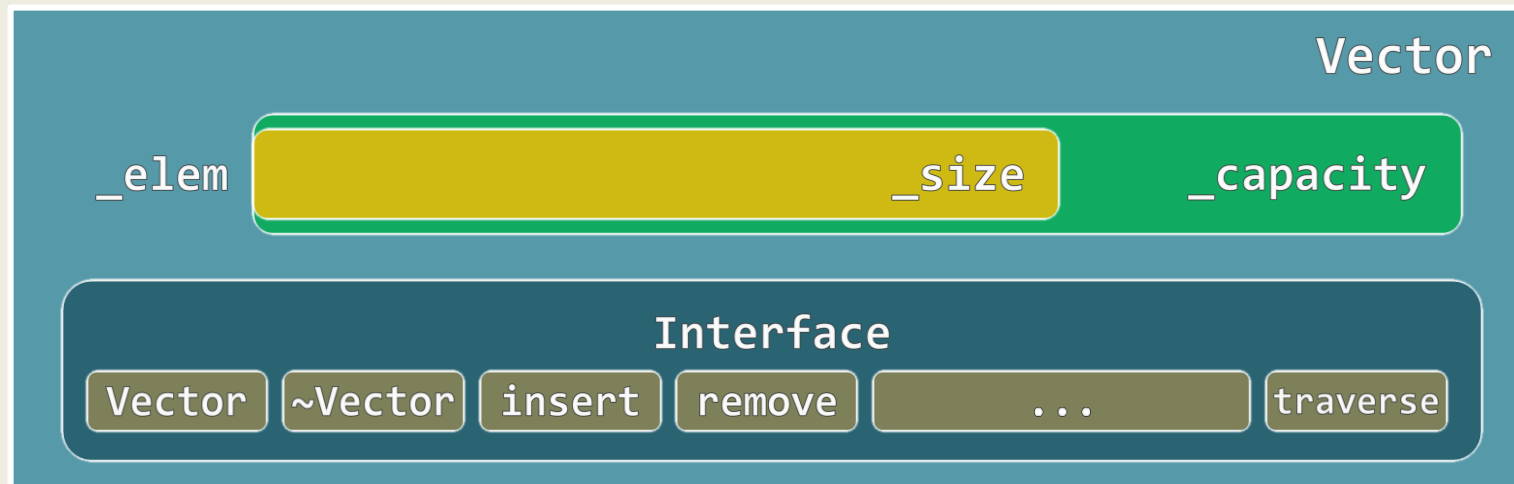
```
/* ... 只读接口 */
```

```
/* ... 可写接口 */
```

```
/* ... 遍历接口 */
```

```
/* ... 遍历接口 */
```

```
};
```



构造 + 析构：重载

```
#define DEFAULT_CAPACITY 3 //默认初始容量（实际应用中可设置为更大）
```

```
Vector( int c = DEFAULT_CAPACITY )
```

```
{ _elem = new T[ _capacity = c ]; _size = 0; } //默认构造
```

```
Vector( T const * A, Rank lo, Rank hi ) //数组区间复制
```

```
{ copyFrom( A, lo, hi ); }
```

```
Vector( Vector<T> const & V, Rank lo, Rank hi ) //向量区间复制
```

```
{ copyFrom( V._elem, lo, hi ); }
```

```
Vector( Vector<T> const & V ) //向量整体复制
```

```
{ copyFrom( V._elem, 0, V._size ); }
```

```
~Vector() { delete [] _elem; } //释放内部空间
```

基于复制的构造

```
template <typename T> //T为基本类型, 或已重载赋值操作符 '='
```

```
void Vector<T>::copyFrom( T const * A, Rank lo, Rank hi ) { //A中元素不致被篡改
```

```
    _elem = new T[ _capacity = max( DEFAULT_CAPACITY, 2*(hi - lo) ) ]; //分配空间
```

```
    for ( _size = 0; lo < hi; _size++, lo++ ) //A[lo, hi)内的元素, 逐一
```

```
        _elem[ _size ] = A[ lo ]; //复制至_elem[0, hi-lo)
```

```
} //O(hi - lo) = O(n)    _elem
```



0 hi - lo s 2*(hi-lo)

A[]

lo

hi