

6.1 Arrays vs. vectors

C++ supports two kinds of ordered list types.

- *Arrays*: declared as `int myList[10]`, accessed as `myList[i]`.
- *Vectors*: declared as `vector<int> myList(10)`, accessed as `myList.at(i)`.

Arrays have a simpler syntax than vectors, but vectors are safer to use. *Thus, using vectors rather than arrays is good practice.*

Vectors are safer because the access `v.at(i)` is checked during execution to ensure the index is within the vector's valid range. An array access `a[i]` involves no such check. *Such checking is important; trying to access an array with an out-of-range index is a very common error, and one of the hardest errors to debug.*

PARTICIPATION ACTIVITY

6.1.1: Writing to an out-of-range index using an array.

Start

☐ 2x speed

```
int userWeights[3];
int userAge;

userAge = 44;

userWeights[0] = 122;
userWeights[1] = 119;
userWeights[2] = 117;
userWeights[3] = 199; // (Problematic)

// Print userAge
```

96

97

98

99

100

44

199

userWeights[0]

userWeights[1]

userWeights[2]

userAge

userWeights

199

Captions

Feedback?

As shown above, assigning with an out-of-range index can mysteriously change some other variable's value. Debugging such an error can be a nightmare.

Vectors have more advantages, like resizing during runtime, easy insertion of items at the front or rear, determining vector size, etc., discussed later. Arrays have minor benefits that don't really outweigh drawbacks. Like choosing to not wear seatbelts, choosing to not use vectors may be quite risky.



C++ allows vectors to be accessed using brackets [], but brackets involve no range checking, so a good practice is to use .at() to access vector elements.

PARTICIPATION ACTIVITY

6.1.2: Arrays and vectors.

Given:

```
int arrayList[5];
vector<int> vectorList(5);
```

1) arrayList[6] = 777 will yield a compiler error.

True

False

2) vectorList[6] = 777 will yield a compiler error.

True

False

3) arrayList[6] = 777 will execute without an error message.

True

False

4) vectorList.at(6) = 777 will execute without an error message.

True

False

5) vectorList[6] = 777 will execute without an error message.

True

False

6) while (i < arrayList.size()) loops while i is less than the array's size.

True

False

Feedback?

How was this section?

Provide section feedback

[↓ 6.2 Array/vector concept \(general\)](#)