

Loops of C++

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Loops, Functions, and Recursion

Loops

C++

```
1  for (int i = 0; i < 10; i++) {  
2      cout << "i is " << i << endl;  
3  }  
4  
5  int i = 0;  
6  while (i < 10) {  
7      cout << "i is " << i << endl;  
8      i++;  
9  }
```

Loops

C++

```
1  for (auto i : {0, 1, 2, 3, 4, 5}) {
2      cout << "i is " << i << endl;
3  }
4
5  // Must #include <vector>
6  vector<int> v = {0, 1, 2, 3, 4, 5}
7  // vector<int>::iterator is the type of it
8  for (auto it = v.begin(); it != v.end(); ++it) {
9      auto i = std::distance(v.begin(), it);
10     cout << "looking at: " << v << " at index " << i << endl;
11 }
```

Java:

```
1  for (int i : new int[]{0, 1, 2, 3, 4, 5}) {
2      System.out.println("i is " + i);
3  }
```

For loops

What's going on?

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1. C++ has iterator based loops at the library level
2. Both have range/for each based loops (like Python)
3. C++ can guess the type (a little bit)
4. C++ lets you use `{..}` literals with less work (and over more types)

For loops

Why iterator loops?

For loops

Why iterator loops?

1. Check out the algorithms library
2. Fairly complicated and uses higher order functions

Recursion

C++

```
1 void counter(int from) {  
2     cout << from << endl;  
3     if (from > 0) {  
4         counter(from - 1);  
5     }  
6 }
```

Java:

```
1 void counter(int from) {  
2     System.out.println(from);  
3     if (from > 0) {  
4         counter(from - 1);  
5     }  
6 }
```

Try it

1. Create a list of digits 0–9
2. Ask the user for a number
3. Print out the elements in the list repeating whenever you hit the end
4. Try rewriting it with the different kinds of loops.