# Lecture 8

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*C++ tries to guard against Murphy, not Machiavelli. - Damian Conway (American Programmer)*

*C++ is an insult to the human brain. - Niklaus Wirth (Creator of Pascal)*

*The problem with C++ is that there's already a strong tendency in the language to require you to know everything before you can do anything. - Larry Wall (Creator of Pearl)*

# Range based for-loop

```
double prices[5] = {1.5, 2.5, 3.5, 4.5, 5.5};
for(double x: prices)
    cout << x << endl;

for(int x : {3, 5, 2, 7, 9})
    cout << x << endl;
```

# while do-while

(./25-whileLoop.cpp)

(./26-dowhileLoop.cpp)

# Looping

- Write a program to calculate the factorial of a number
  - Write two programs. One with `for` loop and the other with `while`.
- Forever loop: `for(;;){}`

# Two dimensional array

- Array of arrays!

```
double a[2][2] = {1, 2, 3, 4};
for(i=0; i<2; i++)
   for(j=0; j<2; j++)
      cout<< a[i][j] << endl;
```

- Process can be continued *ad infinitum*

# Two dimensional array

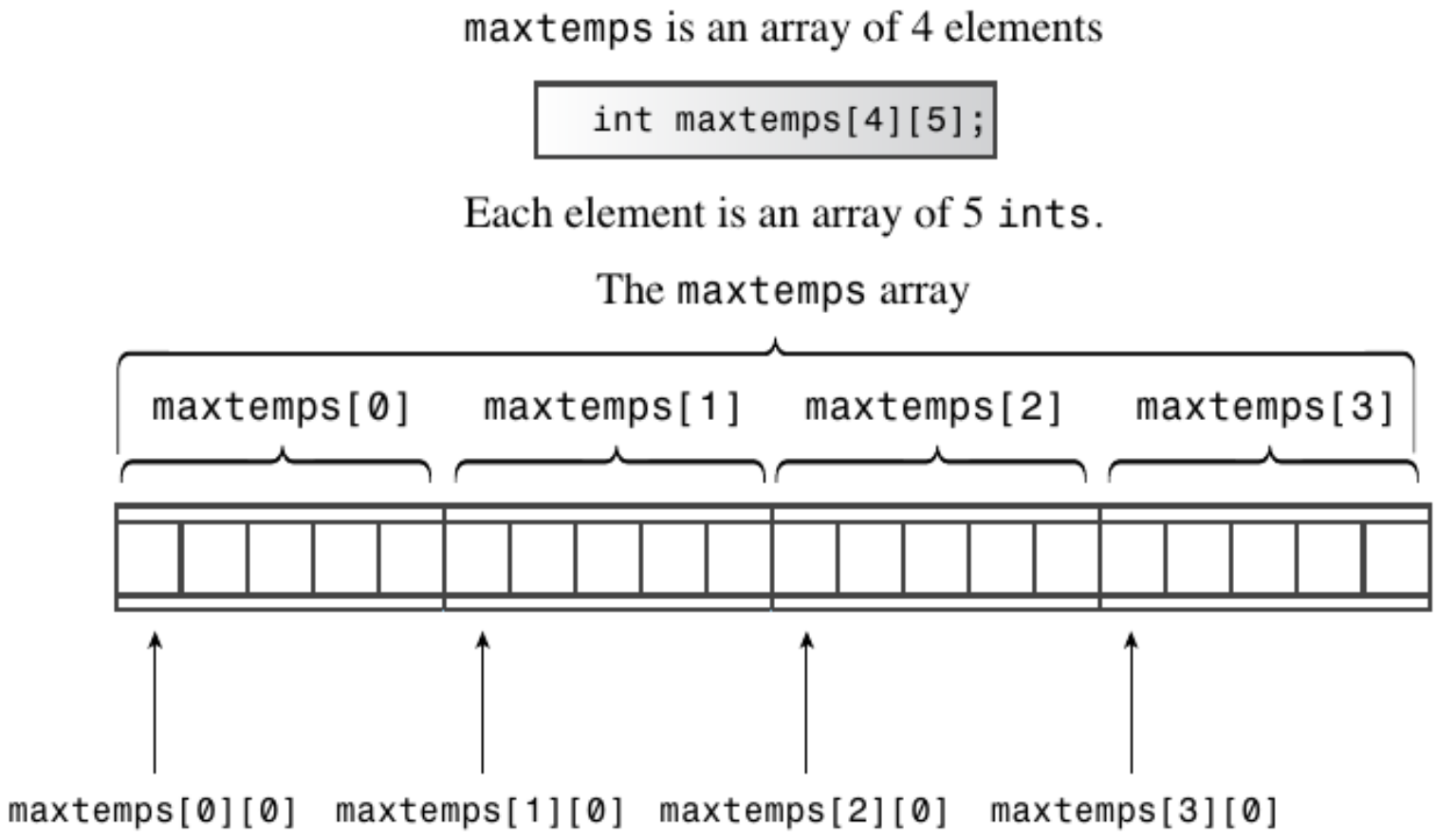


Figure 5.5 An array of arrays.

# Two dimensional array

| | | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| maxtemps[0] | 0 | maxtemps[0][0] | maxtemps[0][1] | maxtemps[0][2] | maxtemps[0][3] | maxtemps[0][4] |
| maxtemps[1] | 1 | maxtemps[1][0] | maxtemps[1][1] | maxtemps[1][2] | maxtemps[1][3] | maxtemps[1][4] |
| maxtemps[2] | 2 | maxtemps[2][0] | maxtemps[2][1] | maxtemps[2][2] | maxtemps[2][3] | maxtemps[2][4] |
| maxtemps[3] | 3 | maxtemps[3][0] | maxtemps[3][1] | maxtemps[3][2] | maxtemps[3][3] | maxtemps[3][4] |

Figure 5.6 Accessing array elements with subscripts.

# Nested loops

```
int n=10; double a[10][10];

for(int i=0; i < n; i++){
   for(int j=0; j < n; j++){
      a[i][j] = i+j;
   }
}
```

- What matrix will `a[i][j] = double((i==j))` create?

(./28-*.cpp)