Section 7: Arrays & Vectors

9 Ocak 2023 Pazartesi 15:25

Lecture 57. Multidimensional Arrays

Arrays

Multi-dimensional arrays

```
const int rows {3};
const int cols {4};
int movie_rating [rows][cols];
```

movie
(second index)

reviewer (first index)	0	1	2	3
0	0	4	3	5
1	2	3	3	5
2	1	4	4	5

BEGINNING C++ PROGRAMMING
Multidimensional Arrays

Lecture 58. Declaring and Initializing Vectors

Vectors

Characteristics

- Dynamic size
- Elements are all the same type
- Stored contiguously in memory
- Individual elements can be accessed by their position or index

- First element is at index 0
- Last element is at index size-1

- [ ] - no checking to see if you are out of bounds
- Provides many useful function that do bounds check

- Elements initialized to zero
- Very efficient
- Iteration (looping) is often used to process

BEGINNING C++ PROGRAMMING
What is a Vector?

Lecture 59. Accessing and Modifying Vector Elements

Vectors

Accessing vector elements – vector syntax

```
vector_name.at(element_index)

test_scores.at(1)
```

```
vector <int> test_scores {100,95,99,87,88};

cout << "First score at index 0: "  << test_scores.at(0) << endl;
cout << "Second score at index 1: " << test_scores.at(1) << endl;
cout << "Third score at index 2:  " << test_scores.at(2) << endl;
cout << "Fourth score at index 3: " << test_scores.at(3) << endl;
cout << "Fifth score at index 4: "  << test_scores.at(4) << endl;
```


Vectors

So, when do they grow as needed?

```
vector_name.push_back(element)
```

```
vector <int> test_scores {100,95,99};    // size is 3

test_scores.push_back(80);               // 100, 95, 99, 80
test_scores.push_back(90);               // 100, 95, 99, 80, 90
```

Vector will automatically allocate the required space!

Vectors

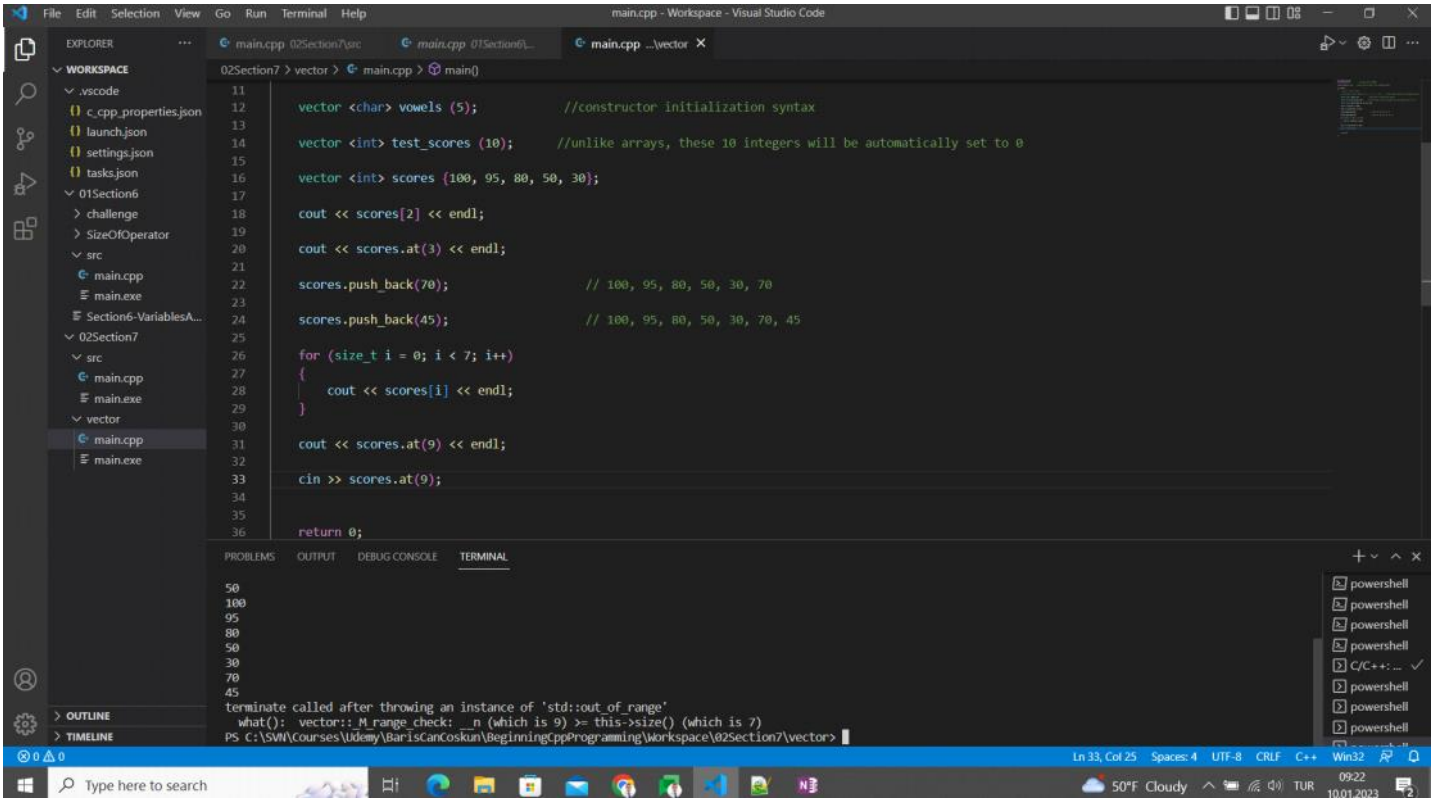
What if you are out of bounds?

- Arrays never do bounds checking
- Many vector methods provide bounds checking
- An exception and error message is generated

```
vector <int> test_scores { 100,95 };

cin >> test_scores.at(5);

terminate called after throwing an instance of 'std::out_of_range'
what():  vector::_M_range_check: __n (which is 5) >= this->size() (which is
2)
This application has requested the Runtime to terminate it in an unusual
way.
Please contact the application's support team for more information.
```


File Edit Selection View Go Run Terminal Help
main.cpp - Workspace - Visual Studio Code
EXPLORER
WORKSPACE
.vscode
c_cpp_properties.json
launch.json
settings.json
tasks.json
01Section6
challenge
SizeOfOperator
src
main.cpp
main.exe
Section6-VariablesA...
02Section7
src
main.cpp
main.exe
vector
main.cpp
main.exe
OUTLINE
TIMELINE
main.cpp 02Section7\src
main.cpp 01Section6\...
main.cpp ...\vector
02Section7 > vector > main.cpp > main()
11
12 vector <char> vowels (5); //constructor initialization syntax
13
14 vector <int> test_scores (10); //unlike arrays, these 10 integers will be automatically set to 0
15
16 vector <int> scores {100, 95, 80, 50, 30};
17
18 cout << scores[2] << endl;
19
20 cout << scores.at(3) << endl;
21
22 scores.push_back(70); // 100, 95, 80, 50, 30, 70
23
24 scores.push_back(45); // 100, 95, 80, 50, 30, 70, 45
25
26 for (size_t i = 0; i < 7; i++)
27 {
28 cout << scores[i] << endl;
29 }
30
31 cout << scores.at(9) << endl;
32
33 cin >> scores.at(9);
34
35
36 return 0;
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
50
100
95
80
50
30
70
45
terminate called after throwing an instance of 'std::out_of_range'
what(): vector::_M_range_check: __n (which is 9) >= this->size() (which is 7)
PS C:\SVN\Courses\Udemy\BarisCanCoskun\BeginningCppProgramming\Workspace\02Section7\vector>
powershell
powershell
powershell
powershell
C/C++: ...
powershell
powershell
powershell
Ln 33, Col 25 Spaces: 4 UTF-8 CRLF C++ Win32
Type here to search
50°F Cloudy
TUR
09:22
10.01.2023