

C++ Programming

Pointers 2

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Playing with Pointers

```
7 int val1 = 5, val2 = 15;
8
9 // 0x21fd 0x7f12
10 cout << &val1 << " " << &val2 << "\n";
11
12 int * p1 = &val1, *p2;
13 p2 = &val2;
14
15 // [value pointed to by p1 = val1] = 10
16 *p1 = 10;
17
18 // [value pointed to by p2 = val2] = [value pointed to by p1 = 16]
19 *p2 = *p1 + 6;
20
21 cout << val1 << " " << val2 << "\n";    // 10 16
```

Playing with Pointers

```
22     p1 = p2;           // let p1 points to where p2 points = &val2
23 // 0x7f12 0x7f12
24     cout << p1 << " " << p2 << "\n";
25
26     *p1 = 20;          // value pointed to by p1 = 20
27
28     cout << val1 << " " << val2 << "\n";
29     cout << *p1 << " " << *p2 << "\n";
30
31     p1 = &val1;
32     cout << *p1 << " " << *p2 << "\n"; // 10 20
33     swap(p1, p2);
34     cout << *p1 << " " << *p2 << "\n"; // 20 10
35
36     double x = 10;
37     // p1 = &x;      // CE: cannot convert 'double*' to 'int*'
38
```

Pointers with other types

```
1 #include <iostream>
2 #include <vector>
3 using namespace std;
4
5 int main() {
6     double x = 10;
7     double* ptr1 = &x;
8
9     string str = "mostafa";
10    string* ptr2 = &str;
11    *ptr2 = "ali";
12    cout << str << "\n";    // ali
13
14    vector<int> v {5, 6, 7};
15    vector<int> *ptr3 = &v;
16    *ptr3 = vector<int> (10);
17    cout<<v.size(); // 10
18    // More next on arrays
19
20    return 0;
21 }
```

- We can use several data types
- Pointer variable size in memory doesn't depend on the data type
- It is just address eventually
 - &your_address

Why pointers?

- So far seems reference can do what pointers can do?!!
- Pointers allows dynamic memory allocation
 - `Int arr[10];` is fixed array
 - What if want dynamic size?
 - Pointers is the way to do so in C++
- In next lectures, we will explore a lot about pointers syntax
- Later we will focus on the memory allocation

“Acquire knowledge and impart it to the people.”

“Seek knowledge from the Cradle to the Grave.”