

MNXB01 course - C++ module

Caterina Marcon

caterina.marcon@hep.lu.se

Ex. string

Write a C++ program that starts from the sentence "Hello! What's your name? how are you?". Save it to a `std::string`, then find the word "how" and output the string "Hello! how are you?" Use the string manipulation function `substr()`.

Ex. string

[C++] String

```
1 #include <iostream>
2 #include <string>
3 using namespace std;
4
5 int main(){
6     string str ("Hello! What's your name? how are you?");
7     cout << str << endl;
8     size_t pos = str.find("how"); //position in string where "how" is found
9
10    cout << str.substr(0, 6) << str.substr(pos) << endl;
11    return 0;
12 }
```

Ex. arrays

Insert the three components of two real arrays (each has three elements). Calculate the modulus (absolute value) of each array and find the largest. The array shall be filled with a for loop.

Ex. arrays

[C++] Arrays - Part 1

```
1 #include <iostream>
2 #include <cmath>
3 using namespace std;
4
5 int main()
6 {
7     float x[3];
8     float y[3];
9     float mod_x, mod_y;
10    int i;
11    int j;
12    cout << "Insert the three components of the first vector" << endl;
13    for (i = 0; i <= 2; i++)
14        cin >> x[i];
15    cout << "Insert the three components of the second vector" << endl;
16    for (j = 0; j <= 2; j++)
17        cin >> y[j];
```

Ex. arrays

[C++] Arrays - Part 2

```
1  mod_x = sqrt(pow(x[0],2)+pow(x[1],2)+pow(x[2],2));
2  mod_y = sqrt(pow(y[0],2)+pow(y[1],2)+pow(y[2],2));
3
4  if (mod_x > mod_y)
5      cout << "Vector x is larger than vector y" << endl;
6  else if (mod_x < mod_y)
7      cout << "Vector y is larger than vector x" << endl;
8  else
9      cout << "Vectors x and y are the same length" << endl;
10
11 return 0;
12 }
```

Ex. vectors

Write a C++ program that accepts 10 double from the user and stores them in a `std::vector`. Then print the `std::vector`

Ex. vectors

[C++] vector

```
1 #include <iostream> //For cout and cin
2 #include <vector> //For vectors
3 using namespace std;
4
5 int main() {
6     vector<double> vec; //create a vector with base type double
7     double input;
8     cout << "Enter a double number: " << endl;
9     while (cin >> input) {
10         vec.push_back(input); //store each input
11         if (vec.size() == 10) break;
12     }
13     cout << "The vector is: " << endl;
14     //print them back
15     for (size_t i = 0; i < vec.size(); ++i) cout << vec.at(i) << endl;
16     return 0;
17 }
```


Exercise

Write a program that prints out the twice of an int number. For the calculation you have to implement a function which requires a pass by value input.

Write a program that prints out the twice of an int number. For the calculation you have to implement a function which requires a pass by reference input.

Write a program that prints out the twice of an int number. For the calculation you have to implement a function which requires a pass by pointer input.

Exercise

[C++] Pass by value, reference or pointer - Part 1

```
1 #include <iostream>
2
3 int ByValue(int);
4 void ByReference(int&);
5 void ByPointer(int*);
6
7 int main() {
8     int number = 5;
9     int numberTwo;
10    int *Pnumber;
11    int *PnumberTwo;
12
13    numberTwo = ByValue(number);
14
15    std::cout << Pnumber <<std::endl;
16    std::cout << "number = " << number << "; numberTwo = " << numberTwo << std::endl;
17    std::cout << PnumberTwo <<std::endl;
18    // By value, number is not modified and the result is saved to numberTwo
19 }
```

Pass by value, reference or pointer - Part 2

[C++] Pass by value, reference or pointer

```
1 std::cout << Pnumber <<std::endl;
2 ByReference(number);
3 std::cout << "number = " << number << std::endl;
4 std::cout << Pnumber <<std::endl;
5 // By reference, number in this main() function is modified and now it is 10
6
7 std::cout << Pnumber <<std::endl;
8 ByPointer(&number);
9 std::cout << "number = " << number << std::endl;
10 std::cout << Pnumber <<std::endl;
11 // By pointer, number in this main() function is modified and now it is 20
12
13 return 0;
```

Pass by value, reference or pointer

[C++] Pass by value, reference or pointer - Part 3

```
1 int ByValue(int n) {  
2     return 2 * n;  
3 }  
4  
5 void ByReference(int& n) {  
6     n = 2 * n;  
7 }  
8  
9 void ByPointer(int* n) {  
10     (*n) = 2 * (*n);  
11 }
```