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BTE2313

Chapter 9: Algorithm

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Objectives

- In this chapter, you will learn about:
 1. Algorithm development process
 2. Introduction on Standard library <algorithm>



Introduction

- An **Algorithm** is a procedure to solve a problem
- An algorithm resolves a problem if it yields an adequate result/output on **ALL** inputs given.
- Many problems can be solved in more than one way, but there is always the best way to solve it (in terms of run-time, memory management, etc.)



Algorithm Development Process

- **STEP 1:** Find the depiction of the problem.
 - Determine what needs to be accomplished
 - Can be very challenging to do
 - Crucial to get this right
- **STEP 2:** Analyze the problem.
- Decide on its start and end points to solve the problem
 - What/where is the data? (inputs)
 - Is there any limitations in working with the data?
 - How the changes will be made to the data?



Algorithm Development Process (cont.)

- **STEP 3:** Develop a high-level algorithm
 - Start including the most important part of the solution, but leaves the finer details later
- **STEP 4:** Cultivate the algorithm by putting more details
 - Which, how, where, what etc.
 - You might need to go through this process several times for more difficult problem.



Algorithm Development Process (cont.)

- **STEP 5:** Review the algorithm
 - go through the algorithm one by one to check whether it solves the original problem
 - Determine whether it solves a very specific problem or a more general problem?
 - Can this algorithm be **simplified**?
 - Check if the solution is **similar** to other problems?



Standard Library Algorithm

- The header `<algorithm>` is used as a collection of functions specially created to be used on many types of element.
- Non-modifying and modifying sequence operations, partitions, sorting, binary search, merge, heap and min/max
- <http://www.cplusplus.com/reference/algorithm/>



Example

```
// max example
#include <iostream>      // cout
#include <algorithm>    // max
using namespace std;

int main () {
    cout << "max(2,3)==> " << max(2,3) << '\n';
    cout << "max('b', 'v')==> " << max('b', 'v') << '\n';
    return 0;
}
```

!! Design a program to get inputs from user, and find the maximum number between 2 numbers given

