Algorithms
Computation

input(s)  Code  output(s)
Algorithm

- Sequence of operations for solving a type of problem
- Similar to
  - Recipe, process, method, technique, procedure, routine
    - E.g., cooking
Features of an Algorithm [Knuth]

- **Finiteness**
  - Eventually completes

- **Definiteness**
  - Precisely defined

- **Input**
  - Objects given before algorithm begins

- **Output**
  - Objects related to the inputs

- **Effectiveness**
  - Sufficiently basic operations to solve a specific class of problems
In Class Example
Vectors

• We often want to store sequences of data
  – E.g., Read in sequence of numbers, list of solutions

• Declare a vector to store integers
  ```
  vector<int> heights;
  ```

• Read and store a series of values
  ```
  while (cin >> val)
  
  temps.push_back(val);
  ```
Vectors

• Declare and initialize a vector

```cpp
vector<int> heights = {1, 2, 3};
```

• Read and output each value

```cpp
for (int i = 0; i < v.size(); ++i) {
    cout << v[i] << '
';
}
```

or

```cpp
for (int i : v) {
    cout << i << '
';
}
```

• Insert a value at a given position

```cpp
v.insert(v.begin() + position, val);
```