Useful C++ Shortcuts & STL Functions

Math Functions

```
min(a, b);          // Returns minimum of a and b
max(a, b);          // Returns maximum of a and b
abs(x);             // Absolute value
pow(x, y);          // x^y
sqrt(x);            // Square root
__gcd(a, b);        // Greatest Common Divisor
lcm(a, b);          // Least Common Multiple (C++17)
```

Sorting & Reversing

```
sort(v.begin(), v.end());             // Sort vector ascending
sort(v.rbegin(), v.rend());           // Sort descending
reverse(v.begin(), v.end());          // Reverse vector
```

Prefix Sum / Accumulate

```
accumulate(v.begin(), v.end(), 0);    // Sum of elements
```

Search

```
find(v.begin(), v.end(), x);          // Find element x
binary_search(v.begin(), v.end(), x); // True if x exists (sorted)
lower_bound(v.begin(), v.end(), x);   // First element >= x
upper_bound(v.begin(), v.end(), x);   // First element > x
```

Containers Shortcuts

```
v.empty();      // Check if vector is empty
v.size();       // Get size
v.clear();      // Clear all elements
v.push_back(x); // Add at end
v.pop_back();   // Remove last
```

String Functions

```
s.substr(start, len);          // Get substring
s.find("abc");                 // Find position of substring
stoi(s);                       // String to int
```

```
to_string(num);                // Int to string
```

Useful STL Containers

```
set<int> s;                    // Sorted unique elements
map<int, int> m;               // Key-value pair
unordered_map<int, int> um;    // Fast key-value (unordered)
queue<int> q;                  // FIFO
priority_queue<int> pq;        // Max heap
```

Custom Sorting

```
bool cmp(pair<int,int> &a, pair<int,int> &b){
    return a.second > b.second; // Sort by second value descending
}
sort(v.begin(), v.end(), cmp);
```