Programming Fundamentals

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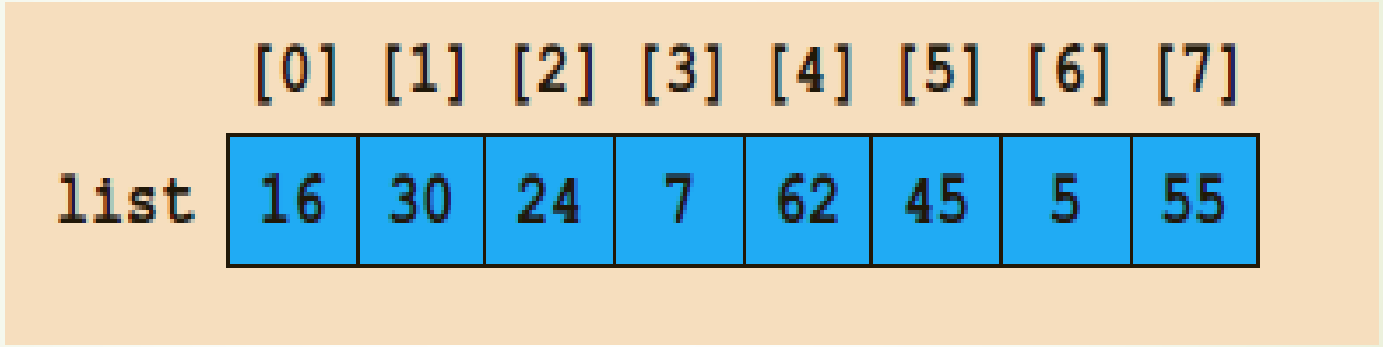
Display Largest Element of an array

```
int main()
{   int i, n;
    float arr[100];
    cout << "Enter total number of elements(1 to 100):
";
    cin >> n;
    cout << endl;
    for(i = 0; i < n; ++i)
    {  cout << "Enter Number " << i + 1 << " : ";
       cin >> arr[i];}
   for(i = 1;i < n; ++i)
    { // Change < to > if you want to find the smallest
element
       if(arr[0] < arr[i])
           arr[0] = arr[i];}
    cout << "Largest element = " << arr[0];
    return 0;}
```

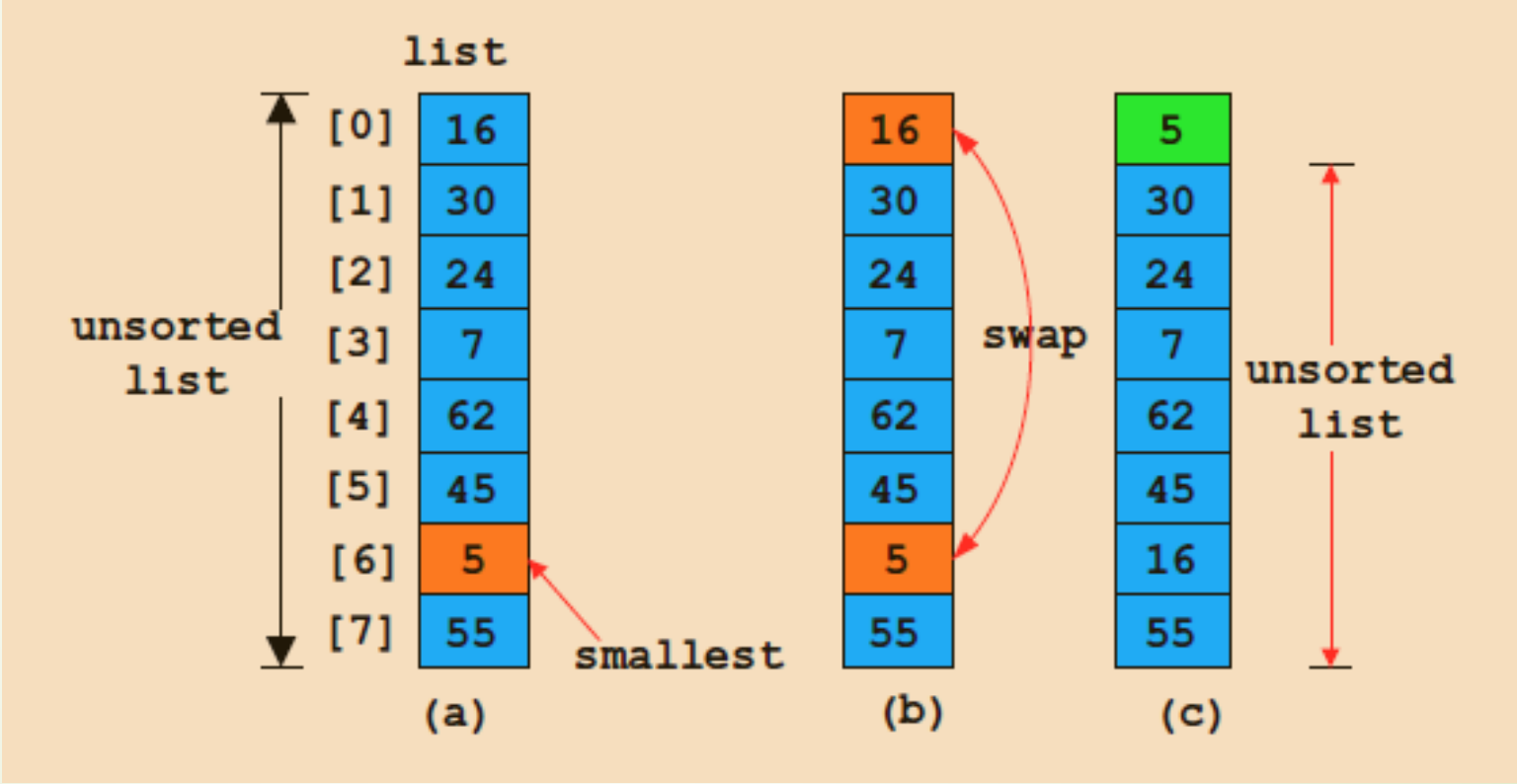
Selection Sort

- in the **selection sort** algorithm, we rearrange the list by selecting an element in the list and moving it to its proper position.
- This algorithm finds the location of the smallest element in the **unsorted portion of the list** and moves it to the **top of the unsorted portion of the list.**
- The first time, we locate the smallest item in the entire list.
- The second time, we locate the smallest item in the list starting from the second element in the list, and so on.

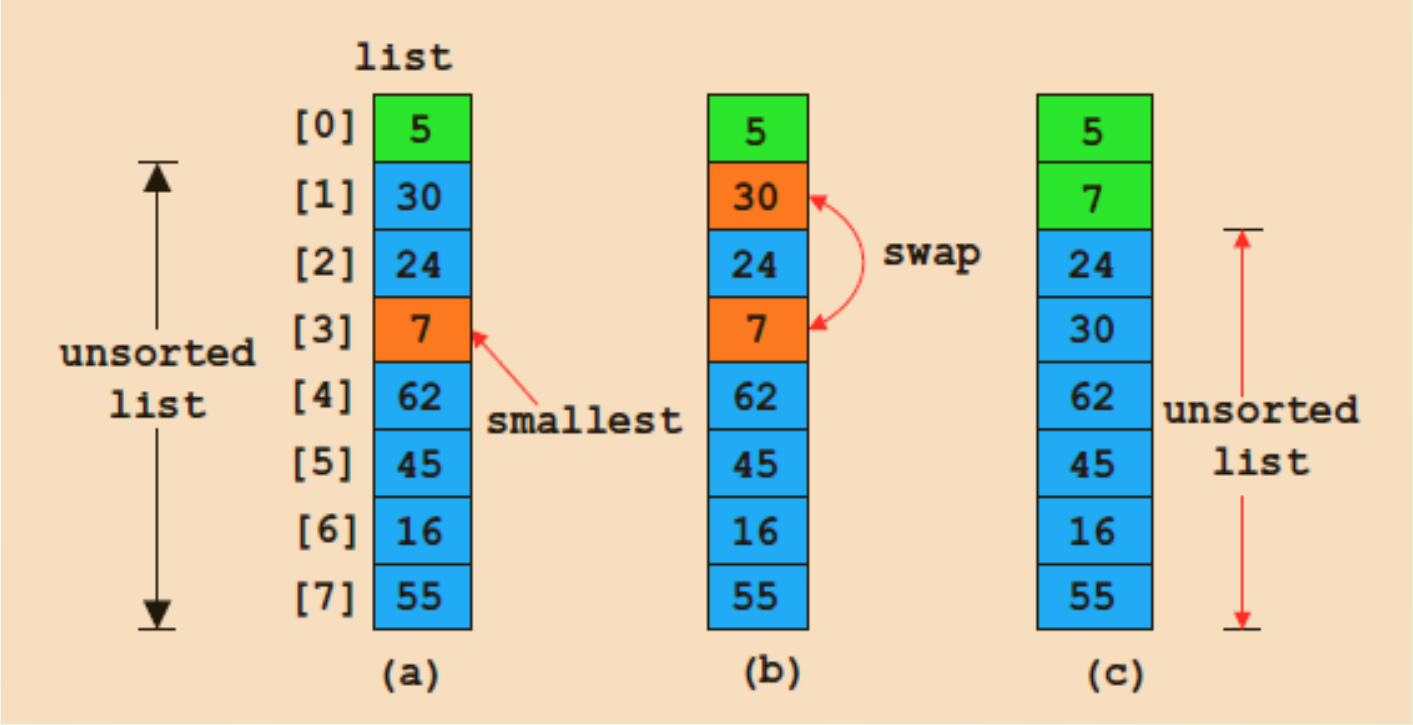
Example



Example


list
[0]
[1]
[2]
[3]
[4]
[5]
[6]
[7]
16
30
24
7
62
45
5
55
unsorted list
smallest
(a)
swap
(b)
(c)
unsorted list

Example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unsorted
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(a)
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(b)
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(c)

Selection Sort - Algorithm

```
void selectionSort(int list[], int length)
{
    int index;
    int smallestIndex;
    int location;
    int temp;

    for (index = 0; index < length - 1; index++)
    {
        //Step a
        smallestIndex = index;

        for (location = index + 1; location < length; location++)
            if (list[location] < list[smallestIndex])
                smallestIndex = location;

        //Step b
        temp = list[smallestIndex];
        list[smallestIndex] = list[index];
        list[index] = temp;
    }
}
```

Exercise

- Implement Selection sort for sorting an array in:
- Ascending order
- Descending order

References

1. C++ Programming: From Problem Analysis to Program Design, Third Edition
2. https://www.just.edu.jo/~yahya-t/cs115/