CSCI 135 Software Design and Analysis, C++
Lab 4

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Lab A: 3M
In this exercise, you will write functions to find the minimum, maximum, and median of an array of integers.

(a) Write a function called minimum that accepts an array of integers and its length and returns the value of the minimum element.

```
int minimum(int * a, int n) {
  int m=a[0];
  for (int i=1; i<n; i=i+1)
    if (a[i]<m)
      m=a[i];
  return m;
}
```

(b) Write a function called maximum that accepts an array of integers and its length and returns the value of the maximum element.

```
int maximum(int * a, int n) {
  int m=a[0];
  for (int i=1; i<n; i=i+1)
    if (a[i]>m)
      m=a[i];
  return m;
}
```

The median of an array is the middle element when the array is rearranged from lowest to highest (if the number of elements is even, we take either one of the middle two). For example, if the array is $[5, 9, 11, 5, 3]$, the median is 5. If the array is $[5, 9, 11, 5, 3, 10]$ the median is either 5 or 9 (does not matter). We will assume that the array contains integers that are not necessarily unique.

(c) Write a function called left that accepts an array a and its length and an integer i and returns the number of elements in a that are less than or equal to i.

```
int left(int * a, int n, int i) {
  int count=0;
  for (int j=0; j<n; j=j+1)
    if (a[j]<=i)
      count=count+1;
  return count;
}
```

(d) Write a function called right that accepts an array a and its length and an integer i and returns the number of elements in a that are greater than or equal to i.

```
int right(int * a, int n, int i) {
  int count=0;
  for (int j=0; j<n; j=j+1)
    if (a[j]>=i)
      count=count+1;
  return count;
}
```

(e) Write a function called median that accepts an array a and its length and returns the value of the median. Your function should use your work in (c) and (d) to find the answer.

```
int median(int * a, int n) {
  for (int i=0; i<n; i=i+1)
    if (left(a,n,a[i])>=n/2.0 && right(a,n,a[i])>=n/2.0)
      return a[i];
}
```