- Previous Lecture:
  - Simulation
  - Application of 1-array and random numbers

- Today's Lecture:
  - while loop
  - Some array algorithms
  - Selection sort

- Assigned reading:
  - Sec 8.4-8.6

Patterns for doing something *n* times

```
for (int i=0; i < n; i++ ) {
   //do something

}
```

```
int i= 0;
while ( i < n ) {
   //do something

   //increment counter
     i++;
}
```

The **while** loop

Syntax:
```
while ( condition )

      statement ;
```

Pattern for doing something *n* times

```
int i= 0;
while ( i < n ) {
       // do something

       // increment counter
         i++;
}
```

---

while versus for

Generally…
- Use for loop for definite iteration
- Use while loop for indefinite iteration

```
while ( not stopping condition ) {
       //do something
}
```

Some important array algorithms

- Basic operations done on a 1-d array that a programmer should know:
- Processing an array
- Searching for the first occurrence of a value
  - Linear search (any array)
  - Binary search (a sorted array)
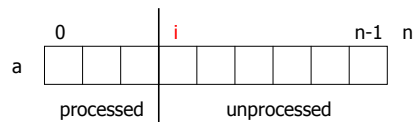- Sorting an array
  - Selection sort
  - Insertion sort

Read Sec 8.5!!!!

Processing an array

i: position where "process" should be applied next
(a[0..i-1] is processed; a[i..] is not yet processed)

Find min value in an array

- General question: Find the location of the min value in array a.
- Suppose you have variable
    int indexMin; //location of min value
- Then the min value is
    a[indexMin]

Linear Search

Find location of value v in array a

- Array a is sorted (e.g., in ascending order)
- What if v is not in a?
  Return the location where v should be inserted in a
- Examples:
  - Find 6 in {2,4,4,6,9}: return 3
  - Find 7 in {2,4,4,6,9}: return 4

Binary search

Sorting

- Arrange elements in a list in some order
- Must specify which order
- Sort "in-place"
- Many algorithms:
  - Select sort
  - Insertion sort
  - Bubble sort, …

Selection Sort

Write a **static** method **selectSort** that

- Has a 1-d numeric array as a parameter
- sorts the numbers in non-descending order in-place

```
/** Sort array in non-descending order */
public static void selectSort(double[] array){
```

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