CSC 212 Tutorial Solution
Sorting

Problem 1

1.
   - $\{(0, F), (1, E), (2, A), (2, B), (4, B), (4, D), (6, E)\}$
   - $\{(0, F), (1, E), (2, B), (2, A), (4, D), (4, B), (6, E)\}$

2. n^2

3. n

Problem 2

```java
public static void selectionSort(int[] A, int n) {
    for (int i = 0; i < n - 1; i++) {
        int min = i;
        for (int j = i + 1; j < n; j++) {
            if (A[j] < A[min])
                min = j;
        }
        int tmp = A[min];
        for (int k = min; k > i; k--)
            A[k] = A[k - 1];
        A[i] = tmp;
    }
}

public static void bubbleSort(int A[], int n) {
    boolean swapped;
    for (int i = 0; i < n - 1; i++) {
        swapped = false;
        for (int j = 0; j < n - 1 - i; j++) {
            if (A[j] > A[j + 1]) {
                int tmp = A[j];
                A[j] = A[j + 1];
                A[j + 1] = tmp;
                swapped = true;
            }
        }
        if (!swapped) break;
    }
}
```

Problem 3

[5,10,4,11,9,7,3,6]

[5,10,4,11]   [9,7,3,6]

[5,10]   [4,11]   [9,7]   [3,6]

[5]   [10]   [4]   [11]   [9]   [7]   [3]   [6]

[5, 10]   [4, 11]   [7, 9]   [3, 6]

[4,5,10,11]   [3,6,7,9]

[3,4,5,6,7,9,10,11]