Figure 8-1: Decision Tree for Insertion Sort

```
InsertionSort(A)
      for (j = 2, j ≤ n, j++)
            key = A[j]
            i = j-1
            while (i > 0, A[i] > key) {
                  swap A[i+1] and A[i]
                  i—
            A[i+1] = key
```

Example: array A has three elements

$$j = 2, i = 1 \quad key = a_2$$

$$a_1 > a_2 \qquad a_1 \leq a_2$$

$$j = 3, i = 2 \quad key = a_3$$

$$a_1 > a_3 \qquad a_1 \leq a_3 \qquad a_2 > a_3 \qquad a_2 \leq a_3$$

$$j = 3, i = 1 \quad key = a_3$$

$$a_2 > a_3 \qquad a_2 \leq a_3 \qquad a_1 > a_3 \qquad a_1 \leq a_3$$

| 1 | 2 | 3 |

a_1 a_2 a_3

a_2 a_1 a_3 | a_1 a_2 a_3

a_2 a_3 a_1 | a_2 a_1 a_3 | a_1 a_3 a_2 | a_1 a_2 a_3

a_3 a_2 a_1 | a_2 a_3 a_1 | a_3 a_1 a_2 | a_1 a_3 a_2

1:2
> ≤
1:3   2:3
> ≤   > ≤
2:3   2, 1, 3   1:3   1, 2, 3
> ≤   > ≤
3, 1, 2   1, 3, 2   3, 2, 1   2, 3, 1