**Find the median using Selection (DAC) where v = 2nd element.**

**A = [7, 8, 11, 3, 9, 1, 4, 10, 3, 8, 6, 12]**

Partition the array A:

low = 0

k = high = 8

pivot = A[low]

12

6

8

3

10

4

1

9

3

11

8

7

12

6

8

3

10

4

1

9

3

11

8

7

12

6

8

3

10

4

1

9

3

11

8

7

8

6

12

3

10

4

1

9

3

11

8

7

8

6

12

3

10

4

1

9

3

11

8

7

3

10

6

8

12

4

1

9

3

11

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10

6

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12

4

1

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3

11

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3

11

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11

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7

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11

9

3

10

8

12

4

1

3

8

7

8

4

6

11

9

3

10

8

12

1

3

7

7

1

8

4

6

11

9

3

10

8

12

3

After split\_array(array A):

AL = [1, 4, 6, 3, 3]

Ap = [7]

AR = [8, 11, 9, 10, 8, 12]

After select(array A, integer K):

pivot = Ap[0] = 7

K = 6

NL = 5

Np = 1

NR = 6

Since 5 < K = 6 ≤ 5+ 1, return **7**

**Count and list (in ascending order) the inversions in**

**A = [1, 5, 4, 8, 10, 2, 6, 9, 3, 7] using merge sort.**

After merge sort:

5

1

7

3

9

6

2

10

8

4

5

1

Inversion Count = 0

Inversions:

8

4

Inversion Count = 0 + 0

Inversions:

1

8

5

4

Inversion Count = 0 + 0 + 1

Inversions: (5, 4)

10

7

3

9

6

2

10

2

Inversion Count = 0 + 0 + 1 + 1

Inversions: (5, 4), (10, 2)

9

6

Inversion Count = 0 + 0 + 1 + 1 + 0

Inversions: (5, 4), (10, 2)

7

3

Inversion Count = 0 + 0 + 1 + 1 + 0

Inversions: (5, 4), (10, 2)

9

10

6

2

Inversion Count = 0 + 0 + 1 + 1 + 0 + 2

Inversions: (5, 4), (10, 2), (10,6), (10,9)

7

3

Inversion Count = 0 + 0 + 1 + 1 + 0 + 2

Inversions: (5, 4), (10, 2), (10,6), (10,9)

1

8

5

4

9

10

6

2

9

8

6

5

2

4

1

10

Inversion Count = 0 + 0 + 1 + 1 + 0 + 2 + 4

Inversions: (5, 4), (10, 2), (10,6), (10,9), (4,2), (5,2), (8,2), (8, 6)

9

8

6

5

2

4

1

7

3

10

2

1

10

9

8

7

6

5

4

3

Inversion Count = 0 + 0 + 1 + 1 + 0 + 2 + 4 + 9 = **17**

Inversions: **(5, 4), (10, 2), (10,6), (10,9), (4,2), (5,2), (8,2), (8, 6), (4,3), (5, 3), (6,3), (8,3), (8,7), (9, 3), (9, 7), (10, 3), (10, 7)**