[1 .... n]

If n is odd,

q2 = (n+1)/2

if q2 is even, then there are an odd number of points below (n+1)/2

q1 = ((n+1)/2)/2 = (n+1)/4

q3 = 3\*(n+1)/4

if q2 is odd, then an even number of points are above and below

q1,1 = (q2-1)/2 = n/4+1/4-1/2 = n/4-1/4 = (n-1)/4

q1,2 = (n-1)/4 + 1 = (n+3)/4

q3,1 = q2+q1,1 = (n+1)/2 + (n-1)/4 = (2n+2)/4 + (n-1)/4 = (3n+1)/4

q3,2 = q3,1+1 = (3n+5)/4

if n is even

q2,1 = n/2

q2,2 = n/2+1

if q2,1 is even, then there are an odd number of points below n/2

q1 = (q2,1)/2 = n/4

q3 = (q2,2)+q1 = n/2+1+n/4 = 3n/4+1

if q2,1 is odd, then there are an even number of points below n/2

q1,1 = (q2,1-1)/2 = (n/2-1)/2 = n/4-1/2 = (n-2)/4

q1,2 = (n-2)/4+1 = (n+2)/4

q3,1 = q2,2+q1,1 = n/2+1 + (n-2)/4 = 2n/4+4/4+n/4-2/4 = 3n/4+2/4 = (3n+2)/4

q3,2 = q3,1+1 = (3n+6)/4

**1** 2 **3 4** **5 6 7 8** 9 **10**

1 3.5 5.5 7.5 10

0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0

1 2 **3**  4 5 **6** 7 8 **9** 10 11

1 2 **3** 4 5 **6 7** 8 9 **10** 11 12

1 2 **3 4** 5 6 **7** 8 9 **10 11** 12 13

1 2 **3 4** 5 6 **7 8** 9 10 **11 12** 13 14

n = length(a)

If n is odd,

q2 = a[(n+1)/2]

if (n+1)/2 is even

q1 = a[(n+1)/4]

q3 = a[(3\*n+3)/4]

if (n+1)/2 is odd

q1 = (a[(n-1)/4]+a[(n+3)/4])/2

q3 = (a[(3n+1)/4]+a[(3n+5)/4])/2

if n is even

q2 = (a[n/2]+a[n/2+1])/2

if q2,1 is even, then there are an odd number of points below n/2

q1 = a[n/4]

q3 = a[3n/4+1]

if q2,1 is odd, then there are an even number of points below n/2

q1= (a[(n-2)/4]+a[(n+2)/4])/2

q3 = (a[(3n+2)/4]+a[(3n+6)/4])/2