Sort\_recursive(i\_start, i\_end)

Global array

i\_up = i\_start

i\_down = i\_end

i\_pivot = (i\_start + i\_end) / 2

WHILE i\_up < i\_down

IF array[i\_up] < array[i\_pivot] and array[i\_down] > array[i\_pivot]:

i\_up++

i\_down- -

ELSE IF array[i\_up] >= array[i\_pivot] and array[i\_down] > array[i\_pivot]

i\_down- -

ELSE IF array[i\_up] < array[i\_pivot] and array[i\_down] < array[i\_pivot]

i\_up++

ELSE IF array[i\_up] >= array[i\_pivot] and array[i\_down] < array[i\_pivot]

array[i\_up], array[i\_down] = array[i\_down], array[i\_up]

IF i\_up == i\_pivot

i\_pivot = i\_down

i\_up ++

ELSE IF i\_down == i\_pivot

i\_pivot = i\_up

i\_down++

ELSE

i\_up++

i\_down++

IF i\_start < i\_end

Sort\_recursive(i\_start, i\_pivot - 1)

Sort\_recursive(i\_pivot + 1, i\_end)

ELSE

RETURN

***Algorithm Metrics:***

O(3n), So the while loop is iterative in nature which causes it to be O(n), the recursive function is called twice at the end of the loop so that’s 2 O(n) ‘s, thereby meaning that there are 3 O(n) or in other words O(3n).

A diagram of a house

Description automatically generated with low confidence

***Modularization Metrics:***

**get\_filename:**

Strong Cohesion, only gets the filename and returns it

Trivial Coupling, doesn’t receive any data

**read\_file:**

Strong Cohesion, only reads the file and returns it

Simple Coupling, receives one parameter and passes a variable based off of that parameter

**sort\_recursion:**

Strong Cohesion, only sorts the list by means of recursion

Interactive Coupling, Due to the function calling itself several times and passing the parameters it received into itself on the recursion it should technically be Interactive

**display:**

Strong Cohesion, only displays the results of the sort

Simple Coupling, Receives one parameter from main

***Test Cases:***

1. [1,5,2,3,4,8,6,45,3,3,15,33,10,500,300,34,23,12,45,67]
2. [12, 20, 40, 19, 10]
3. [0, 0, 0, 0]
4. [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
5. [1]

***Trace:***

Context: I put a trace into the program I wrote and this is how it popped out, Called is everytime that the function is called and Iteration should keep track of how many times the while loop goes through, there’s 30 something pages of results so good luck with that:

i\_end: 10

i\_pivot: 9

Iteration: 1

i\_up: 8

i\_down: 10

i\_pivot: 9

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 8

i\_end: 8

i\_pivot: 8

Called ---------------

i\_start: 10

i\_end: 10

i\_pivot: 10

Called ---------------

i\_start: 12

i\_end: 19

i\_pivot: 15

Iteration: 1

i\_up: 12

i\_down: 19

i\_pivot: 15

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 14

i\_pivot: 13

Iteration: 1

i\_up: 12

i\_down: 14

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 14

i\_pivot: 14

Called ---------------

i\_start: 16

i\_end: 19

i\_pivot: 17

Iteration: 1

i\_up: 16

i\_down: 19

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 2

i\_up: 17

i\_down: 18

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 2

i\_up: 13

i\_down: 18

i\_pivot: 15

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 14

i\_pivot: 13

Iteration: 1

i\_up: 12

i\_down: 14

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 14

i\_pivot: 14

Called ---------------

i\_start: 16

i\_end: 19

i\_pivot: 17

Iteration: 1

i\_up: 16

i\_down: 19

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 2

i\_up: 17

i\_down: 18

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 3

i\_up: 14

i\_down: 17

i\_pivot: 15

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 14

i\_pivot: 13

Iteration: 1

i\_up: 12

i\_down: 14

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 14

i\_pivot: 14

Called ---------------

i\_start: 16

i\_end: 19

i\_pivot: 17

Iteration: 1

i\_up: 16

i\_down: 19

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 2

i\_up: 17

i\_down: 18

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 4

i\_up: 15

i\_down: 16

i\_pivot: 15

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 4

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Called ---------------

i\_start: 12

i\_end: 15

i\_pivot: 13

Iteration: 1

i\_up: 12

i\_down: 15

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 15

i\_pivot: 14

Iteration: 1

i\_up: 14

i\_down: 15

i\_pivot: 14

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 14

i\_end: 13

i\_pivot: 13

Called ---------------

i\_start: 15

i\_end: 15

i\_pivot: 15

Iteration: 2

i\_up: 13

i\_down: 14

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 15

i\_pivot: 14

Iteration: 1

i\_up: 14

i\_down: 15

i\_pivot: 14

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 14

i\_end: 13

i\_pivot: 13

Called ---------------

i\_start: 15

i\_end: 15

i\_pivot: 15

Called ---------------

i\_start: 17

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 17

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 17

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 8

i\_up: 11

i\_down: 12

i\_pivot: 11

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 4

i\_end: 10

i\_pivot: 7

Iteration: 1

i\_up: 4

i\_down: 10

i\_pivot: 7

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 4

i\_end: 6

i\_pivot: 5

Iteration: 1

i\_up: 4

i\_down: 6

i\_pivot: 5

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 4

i\_end: 4

i\_pivot: 4

Called ---------------

i\_start: 6

i\_end: 6

i\_pivot: 6

Called ---------------

i\_start: 8

i\_end: 10

i\_pivot: 9

Iteration: 1

i\_up: 8

i\_down: 10

i\_pivot: 9

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 8

i\_end: 8

i\_pivot: 8

Called ---------------

i\_start: 10

i\_end: 10

i\_pivot: 10

Iteration: 2

i\_up: 5

i\_down: 9

i\_pivot: 7

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 4

i\_end: 6

i\_pivot: 5

Iteration: 1

i\_up: 4

i\_down: 6

i\_pivot: 5

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 4

i\_end: 4

i\_pivot: 4

Called ---------------

i\_start: 6

i\_end: 6

i\_pivot: 6

Called ---------------

i\_start: 8

i\_end: 10

i\_pivot: 9

Iteration: 1

i\_up: 8

i\_down: 10

i\_pivot: 9

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 8

i\_end: 8

i\_pivot: 8

Called ---------------

i\_start: 10

i\_end: 10

i\_pivot: 10

Iteration: 3

i\_up: 6

i\_down: 8

i\_pivot: 7

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 4

i\_end: 6

i\_pivot: 5

Iteration: 1

i\_up: 4

i\_down: 6

i\_pivot: 5

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 4

i\_end: 4

i\_pivot: 4

Called ---------------

i\_start: 6

i\_end: 6

i\_pivot: 6

Called ---------------

i\_start: 8

i\_end: 10

i\_pivot: 9

Iteration: 1

i\_up: 8

i\_down: 10

i\_pivot: 9

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 8

i\_end: 8

i\_pivot: 8

Called ---------------

i\_start: 10

i\_end: 10

i\_pivot: 10

Called ---------------

i\_start: 12

i\_end: 19

i\_pivot: 15

Iteration: 1

i\_up: 12

i\_down: 19

i\_pivot: 15

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 14

i\_pivot: 13

Iteration: 1

i\_up: 12

i\_down: 14

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 14

i\_pivot: 14

Called ---------------

i\_start: 16

i\_end: 19

i\_pivot: 17

Iteration: 1

i\_up: 16

i\_down: 19

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 2

i\_up: 17

i\_down: 18

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 2

i\_up: 13

i\_down: 18

i\_pivot: 15

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 14

i\_pivot: 13

Iteration: 1

i\_up: 12

i\_down: 14

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 14

i\_pivot: 14

Called ---------------

i\_start: 16

i\_end: 19

i\_pivot: 17

Iteration: 1

i\_up: 16

i\_down: 19

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 2

i\_up: 17

i\_down: 18

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 3

i\_up: 14

i\_down: 17

i\_pivot: 15

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 14

i\_pivot: 13

Iteration: 1

i\_up: 12

i\_down: 14

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 14

i\_pivot: 14

Called ---------------

i\_start: 16

i\_end: 19

i\_pivot: 17

Iteration: 1

i\_up: 16

i\_down: 19

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 2

i\_up: 17

i\_down: 18

i\_pivot: 17

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 16

i\_end: 16

i\_pivot: 16

Called ---------------

i\_start: 18

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 18

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 18

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Iteration: 4

i\_up: 15

i\_down: 16

i\_pivot: 15

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 4

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Called ---------------

i\_start: 12

i\_end: 15

i\_pivot: 13

Iteration: 1

i\_up: 12

i\_down: 15

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 15

i\_pivot: 14

Iteration: 1

i\_up: 14

i\_down: 15

i\_pivot: 14

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 14

i\_end: 13

i\_pivot: 13

Called ---------------

i\_start: 15

i\_end: 15

i\_pivot: 15

Iteration: 2

i\_up: 13

i\_down: 14

i\_pivot: 13

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 12

i\_end: 12

i\_pivot: 12

Called ---------------

i\_start: 14

i\_end: 15

i\_pivot: 14

Iteration: 1

i\_up: 14

i\_down: 15

i\_pivot: 14

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 2

Called ---------------

i\_start: 14

i\_end: 13

i\_pivot: 13

Called ---------------

i\_start: 15

i\_end: 15

i\_pivot: 15

Called ---------------

i\_start: 17

i\_end: 19

i\_pivot: 18

Iteration: 1

i\_up: 17

i\_down: 19

i\_pivot: 18

[1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]

Block 1

Called ---------------

i\_start: 17

i\_end: 17

i\_pivot: 17

Called ---------------

i\_start: 19

i\_end: 19

i\_pivot: 19

Sorted: [1, 2, 3, 3, 3, 4, 5, 6, 8, 10, 12, 15, 23, 33, 34, 45, 45, 67, 300, 500]