

CSC2401
Algorithms and Data Structures

Assignment 2

Author: Cameron Duncan-Kemp
Student ID: u1032841

Question 1

- The pivot for the array given would be the 7th index value in the array, which is 60, as it is the middle element.
- `int arr[] = {58, 30, 55, 48, 35, 8, 15, 10, 60, 70, 78, 75, 80, 62, 90};`
- There were 7 swaps during the initial partitioning, not including the swapping of the pivot back and forth.
- The lower partition has 8 values in it and the upper partition has 6 values in it.

Question 2

b. Search for 20

5, 12, 25, 32, 38, 46, 58, 62, 85, 90, 97, 105, 110

| Iteration | First | Last | Mid | List[mid] | No. of Comparisons |
|-----------|-------|------|-----|-----------|--------------------------------|
| 1 | 0 | 12 | 6 | 58 | 2 |
| 2 | 0 | 5 | 2 | 25 | 2 |
| 3 | 0 | 1 | 0 | 5 | 2 |
| 4 | 1 | 1 | 1 | 12 | 2 |
| 5 | 2 | 1 | 1 | 12 | Loop stopped (first > last) |

Total comparisons = 8

c. Search for 105

5, 12, 25, 32, 38, 46, 58, 62, 85, 90, 97, 105, 110

| Iteration | First | Last | Mid | List[mid] | No. of Comparisons |
|-----------|-------|------|-----|-----------|--------------------------------|
| 1 | 0 | 12 | 6 | 58 | 2 |
| 2 | 7 | 12 | 9 | 90 | 2 |
| 3 | 10 | 12 | 11 | 105 | Loop stopped (found = true) |

Total comparisons = 4

Task 1

```
C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2>task1.exe "C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2"
Name: task1.o
Date: 20190904.174338
Size: 528646 bytes
Name: task1.exe
Date: 20190904.174340
Size: 3713328 bytes
Name: task1.cpp
Date: 20190904.174446
Size: 1208 bytes
Name: Report.docx
Date: 20190903.185259
Size: 16933 bytes
Name: dir.h
Date: 20190903.190345
Size: 2714 bytes
Name: .vscode
Date: 20190903.191629
Size: -1 bytes
Number of list items constructed but not released= 6
Number of list items constructed but not released= 0
```

```
C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2>task1.exe "C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2\123124"
Exception occurred: path does not exist
```

```
C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2>_
```

```
C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2>task1.exe "C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2\Report.docx"
Exception occurred: path exists but is not a directory
```

```
C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2>_
```

Task 2

```
C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2>task2.exe "C:\Users\Cameron\Documents\My Games\FINAL FANTASY XV"
Directory: C:\Users\Cameron\Documents\My Games\FINAL FANTASY XV
  Directory: C:\Users\Cameron\Documents\My Games\FINAL FANTASY XV\Steam
    Directory: C:\Users\Cameron\Documents\My Games\FINAL FANTASY XV\Steam\76561197994855042
      Directory: C:\Users\Cameron\Documents\My Games\FINAL FANTASY XV\Steam\76561197994855042\savestorage
        Directory: C:\Users\Cameron\Documents\My Games\FINAL FANTASY XV\Steam\76561197994855042\savestorage\system
          Name: system_data.save
          Date: 20190713.162836
          Size: 2581 bytes
          Name: live_config_data.save
          Date: 20190713.162836
          Size: 12021 bytes
Number of list items constructed but not released= 8
        Directory: C:\Users\Cameron\Documents\My Games\FINAL FANTASY XV\Steam\76561197994855042\savestorage/snapshot
          Name: snapshotlink.sl
          Date: 20190713.163241
          Size: 3653 bytes
          Name: 00000717.ss
          Date: 20190713.163241
          Size: 143445 bytes
Number of list items constructed but not released= 8
          Name: KeyConfig.ini
          Date: 20190713.162836
          Size: 3201 bytes
          Name: GraphicsConfig.ini
          Date: 20190713.162836
          Size: 597 bytes
Number of list items constructed but not released= 4
        Directory: C:\Users\Cameron\Documents\My Games\FINAL FANTASY XV\Steam\76561197994855042/mod
          Name: binmod.list
          Date: 20190713.162524
          Size: 0 bytes
Number of list items constructed but not released= 4
Number of list items constructed but not released= 2
Number of list items constructed but not released= 1
Number of list items constructed but not released= 0

C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2>
```

Task 3

```
C:\Users\Cameron\Documents\University\S2 2019\Algorithms and Data Structures\Assignment 2>task3.exe
Number of list items constructed but not released= 1
Number of list items constructed but not released= 2
Number of list items constructed but not released= 3
Name: green
Date: 21/04/2019
Size: 4556 bytes
Name: blue.exe
Date: 21/03/2019
Size: 123 bytes
Name: red.exe
Date: 21/01/2019
Size: 2581 bytes
Number of list items constructed but not released= 0
```