Problem - 1

Part (a)

[10, 12, 3, 11, 6, 8, 9]
 0   1   2 3 4 5 6

①

②

④

⑤

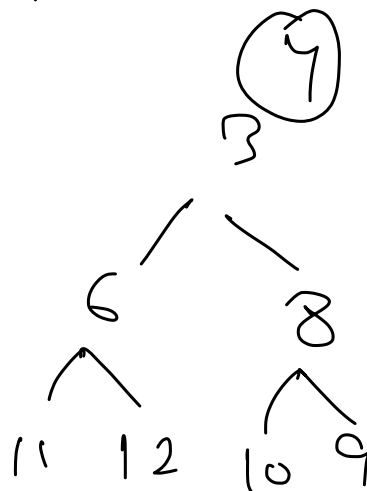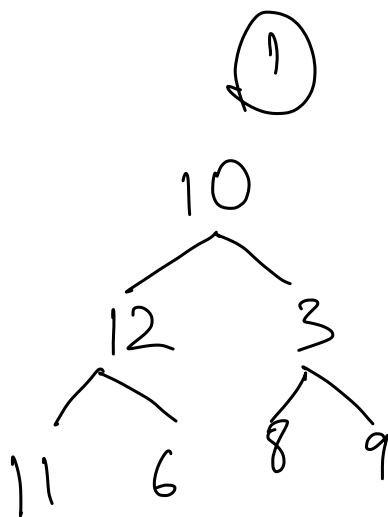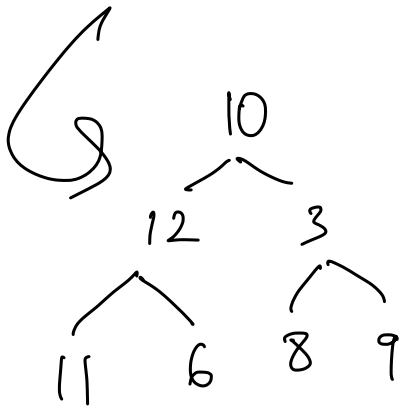Part-(b)
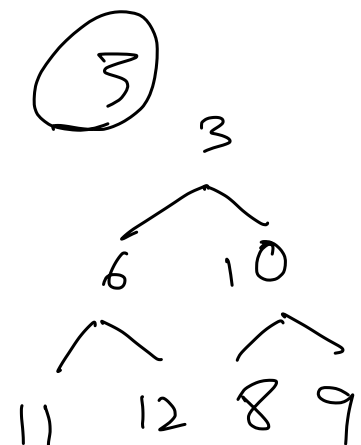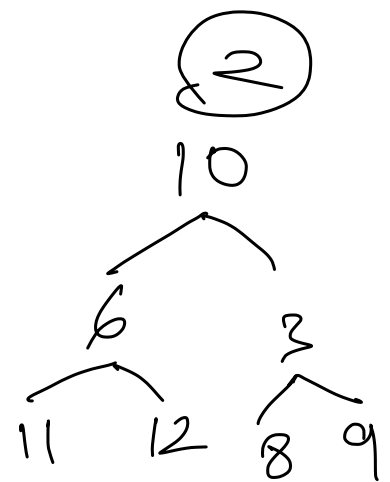
$$[2,4,6,8,10,12,14,16]$$
indices: 0 1 2 3 4 5 6 7

```
        2
       / \
      4   6
     / \  / \
    8  10 12 14
   /
  16
```

Insert 3
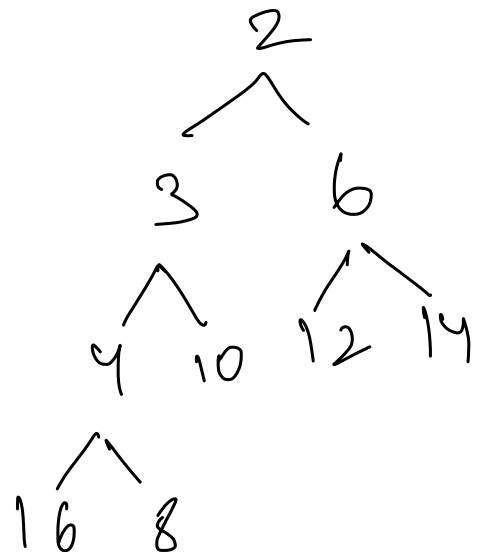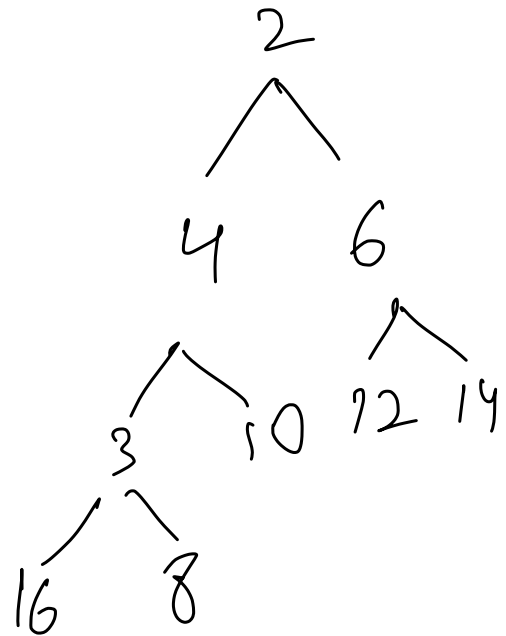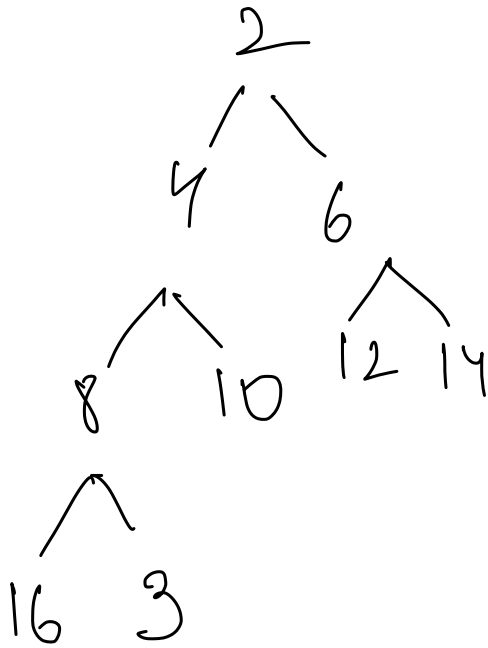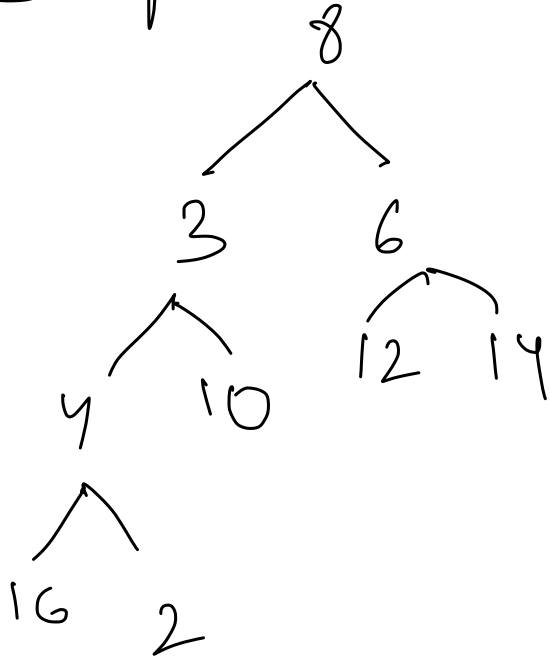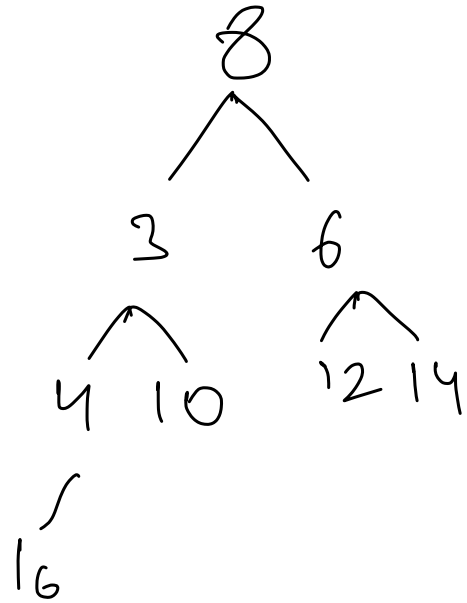
```
         2
        / \
       4   6
      / \   \
     8  10  12 14
    / \
   16  3
```

→

```
        2
       / \
      4   6
     / \   \
    3  10  12 14
   / \
  16  8
```

↓

```
          2
         / \
        3   6
       / \  / \
      4  10 12 14
     / \
    16  8
```

Pop Top Element
Swap(2 & 8)

```
        8
       / \
      3   6
     / \  / \
    4  10 12 14
   / \
  16  2
```

→

Removed 2

```
        8
       / \
      3   6
     / \  / \
    4  10 12 14
   /
  16
```

Trickling Down ⇓

```
        3
       / \
      8   6
     / \  / \
    4  10 12 14
   /
  16
```

←

```
        3
       / \
      4   6
     / \  / \
    8  10 12 14
   /
  16
```

Pop Top Element

Swap (3 & 16)

```
        16
       /  \
      4    6
     / \   / \
    8  10 12 14
   /
  3
```

→

Remove(3)

```
        16
       /  \
      4    6
     / \   / \
    8  10 12 14
```

↓ Trickling Down

```
         4
        / \
      16   6
     / \   / \
    8  10 12 14
```

←

```
         4
        / \
       8   6
      / \   / \
    16  10 12 14
```
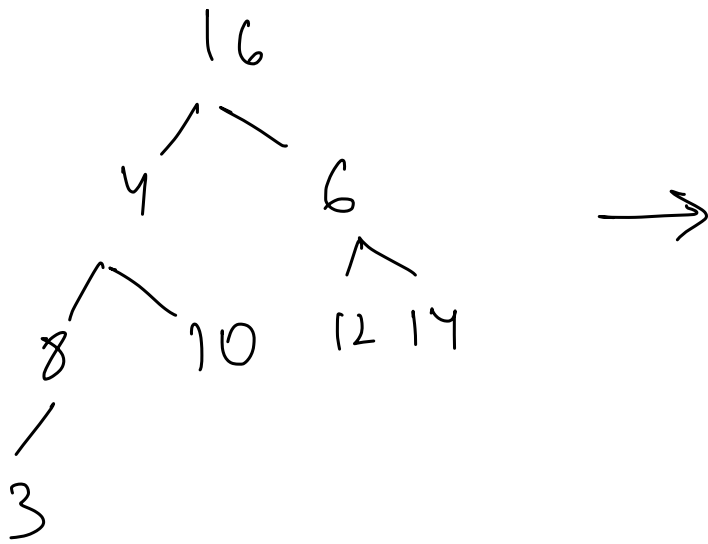
Insert (5)

```
        4
       / \
      8   6
     / \  / \
   16  10 12 14
   /
  5
```

Trickle Up →

```
            4
           / \
          8   6
         / \  / \
        5  10 12 14
       /
      16
```

↓

```
        4
       / \
      5   6
     / \  / \
    8  10 12 14
   /
  16
```
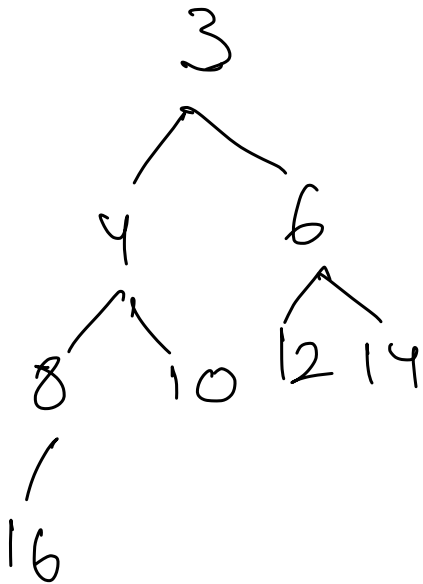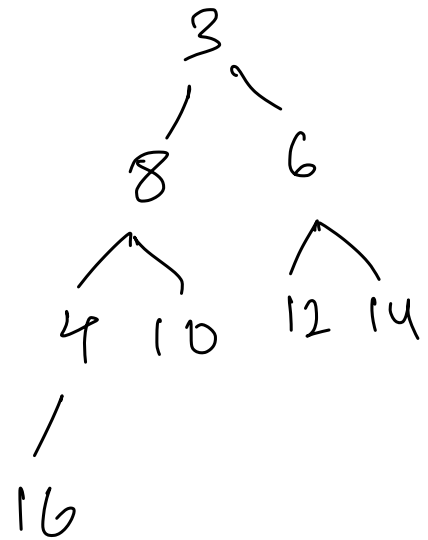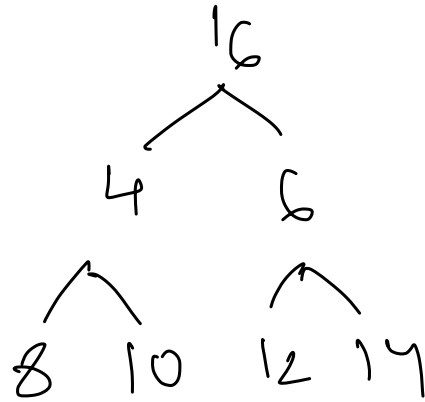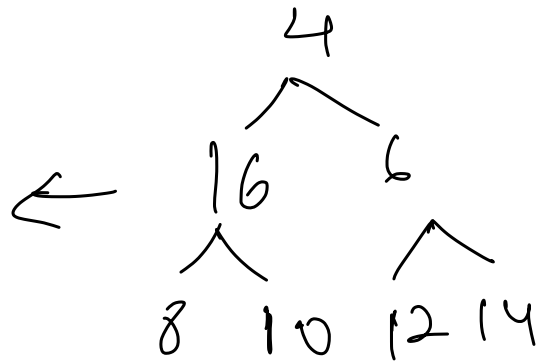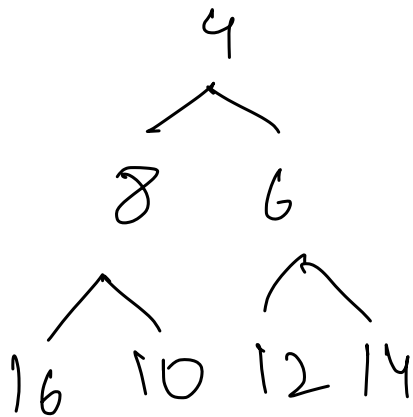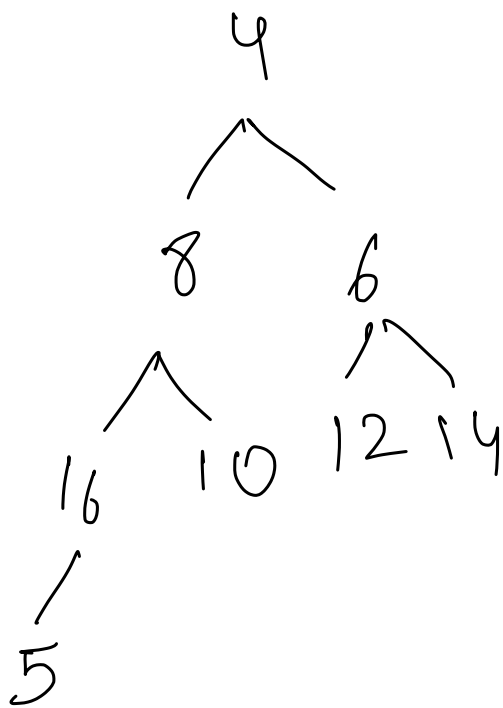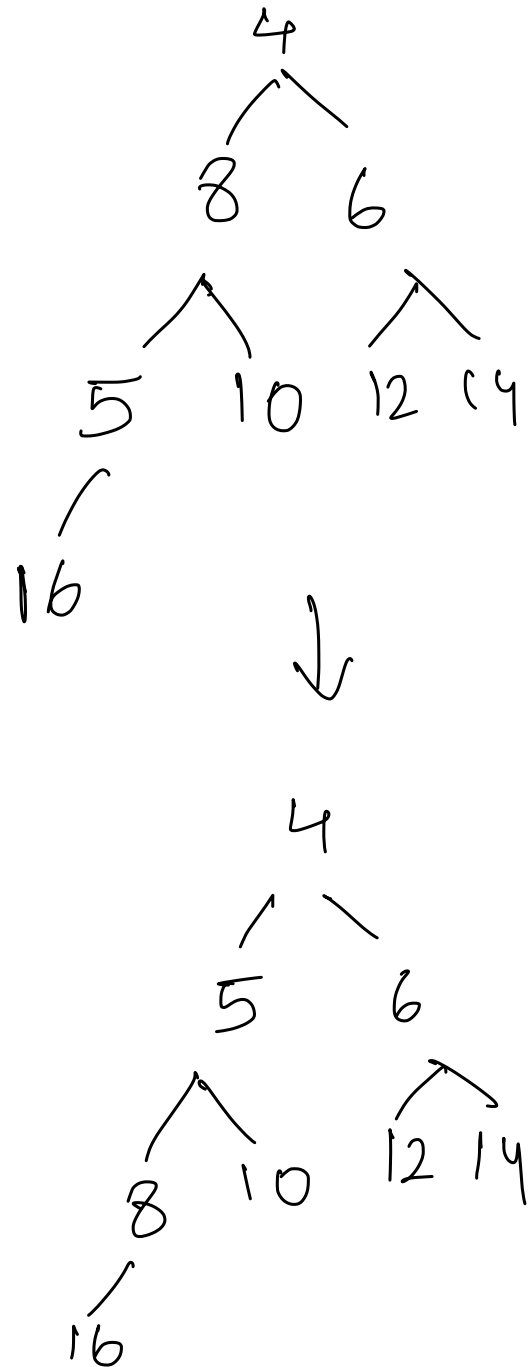
On Next Page I have visual representation of Problem-2, however the answer is also given in q2.txt.

Problem-2 A* Algorithm Tracing

Finish Point → A

L → Starting Point

L $h \to 5$
$g \to 0$
$f \to g + h = 5$

P $h \to 6$
$g \to 1$
$f \to g + h = 7$

H $h \to 4$
$g \to 1$
$f \to g + h = 5$

G $h \to 3$
$g \to 2$
$f \to 5$

D $h \to 3$
$g \to 1$
$f \to 5$

C $h \to 2$
$g \to 3$
$f \to 5$

B $h \to 1$
$g \to 4$
$f \to 5$

A $h \to 0$
$g \to 5$
$f \to 5$