CS 260 – Homework #6

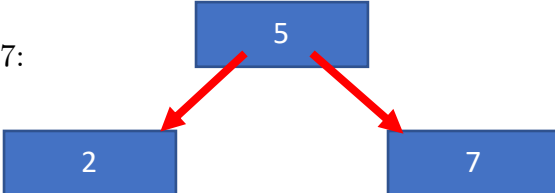## Chris Kasper
February 16, 2018
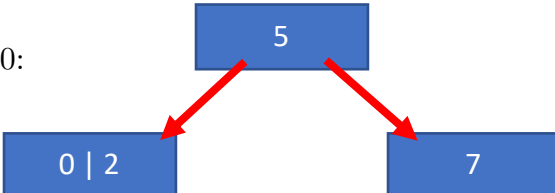
Problem 1 (5.7 from text)

Show the 2-3 tree that results if we insert into an empty set, represented as a 2-3 tree, the elements 5, 2, 7, 0, 3, 4, 6, 1, 8, 9.
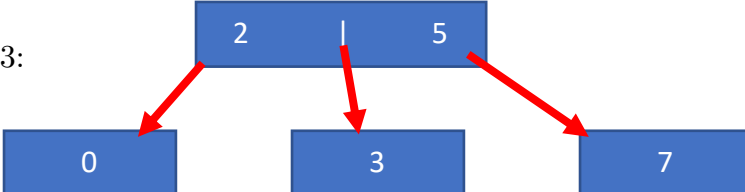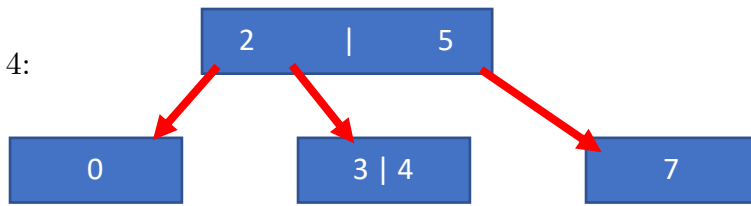
Solution

Insert 5:

```
┌─────────┐
│    5    │
└─────────┘
```
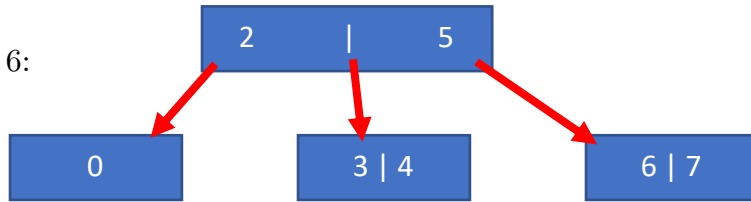
Insert 2:

```
┌─────────┐
│  2 | 5  │
└─────────┘
```

Insert 7:

```
         ┌─────┐
         │  5  │
         └─────┘
        ↙        ↘
┌─────┐            ┌─────┐
│  2  │            │  7  │
└─────┘            └─────┘
```

Insert 0:

```
         ┌─────┐
         │  5  │
         └─────┘
        ↙        ↘
┌───────┐          ┌─────┐
│ 0 | 2 │          │  7  │
└───────┘          └─────┘
```

Insert 3:

```
      ┌───────────────┐
      │   2   |   5   │
      └───────────────┘
       ↙       ↓        ↘
┌─────┐    ┌─────┐    ┌─────┐
│  0  │    │  3  │    │  7  │
└─────┘    └─────┘    └─────┘
```

Insert 4:

```
        2  |  5
       /   |    \
      0   3 | 4   7
```

Insert 6:

```
        2  |  5
       /   |    \
      0   3 | 4  6 | 7
```

Insert 1:

```
        2  |  5
       /   |    \
    0 | 1  3 | 4  6 | 7
```

Insert 8:

```
              5
           /     \
          2       7
         / \     / \
     0 | 1 3 | 4  6   8
```

Insert 9:

```
              5
           /     \
          2       7
         / \     / \
     0 | 1 3 | 4  6  8 | 9
```
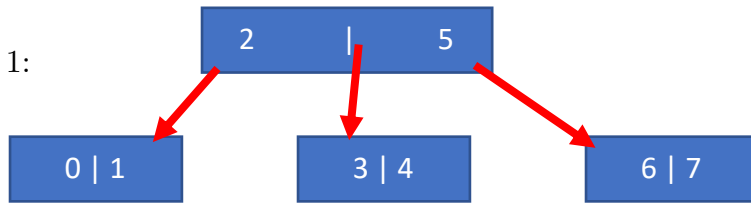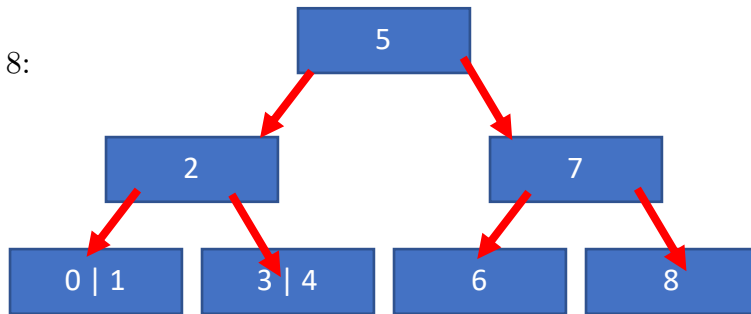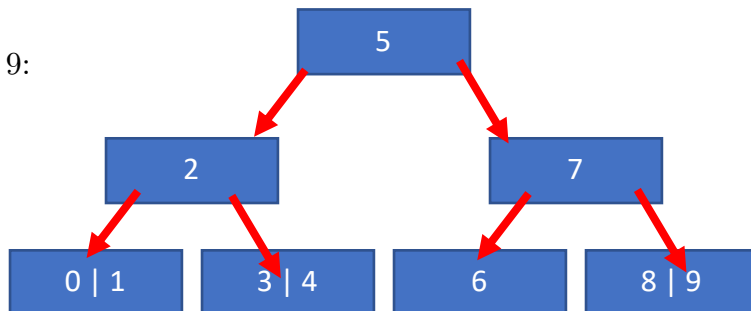
Done.

Problem 2 (5.8 from text)

Show the result of deleting 3 from the 2-3 tree that results from Exercise 5.7

Solution