Question 1 [1 mark]
Find an insertion order for the keys S E A R C H X M that leads to a 2-3 tree of height 1 for internal nodes. (Note: height at root level is 0)

The expected tree is:

```
    ER        →          S0
AC HM SX             S1  S2  S3
```

Therefore the insertion order could be one of the following:

```
A E H S R C M X
E H A S R C M X
…
S0 S1 S2
S0 S2 S1        S0 S3
S1 S0 S2   ->           -> permutation of (S1 S2 S3)
S1 S2 S0        S3 S0
S2 S0 S1
S2 S1 S0
```

The first occurrence of 'Si' stands for one element (e.g. E) chosen from set i, where i=0,1,2,3. The later occurrence of 'Si' stands for the other element (e.g. R) in set i.

The above is only one solution and there would be more variations. The idea is that we can first build a triangle

```
 E          E
A H  or   H  S  or  …
```

Then build:

```
 ER
A H S
```

Last we just fill out the missing elements (C, M and X).

Name:
Student #:

Question 2 [1 mark]
Draw the red-black BST that results when you insert items with the keys E A S Y Q U T I O N in that order into an initially empty tree.