COS226 Week 9 Activity

Algorithms 4th edition, Section 5.1, 5.2 and 5.3

1. Give the KMP DFA for the pattern MAMAMIA over the 3 letter alphabet by filling in the table below. Draw the DFA too.

```
     M   A   M   A   M   I   A
     0   1   2   3   4   5   6
     ------------------------
  A  0   2

  I  0   0

  M  1   1
```

2. Give the trace using Boyer-Moore to search for the pattern BANANA in the text

   PINEAPPLESMANGOSANDBANANAS

   by completing the table below.

```
i  j  0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
      P  I  N  E  A  P  P  L  E  S  M  A  N  G  O  S  A  N  D  B  A  N  A  N  A  S
```

3. Suppose that you run MSD radix sort (do not cutoff to insertion sort for small subarrays) on the following array of jelly bean flavors. What is the array immediately after performing key-indexed counting for the third time?

```
plum

lemon

pear

lime

peach

banana

grape
```

4. Build an R-way trie for the key-value pairs assuming R = 5: bad 1, bald 2, banana 3.

5. Build a TST for the same 3 key-value pairs.