Problem 2

1. The worst case is that in each recursion depth, we have n elements to be sorted (i.e. will not end because only one element in the group). And the maximum number of digits is the same number of digits of , which should be . And the assume the radix is a constant, then the total runtime for worst-case should be
2. The best case is that all patterns are found at the beginning of the text.

For the first guess, it cost

For the rest guesses, each costs

Therefore, totally, we have n-m+1 guesses, which is

So the best-case expected runtime is

The worst case is that for each guess, the hash value matches, and we need do a strcmp() for each pattern. And finally, we will find the matched pattern in the last guess.

For every guesses, each cost , similar to the best case, we have guesses in total. Therefore, the worst-case runtime is