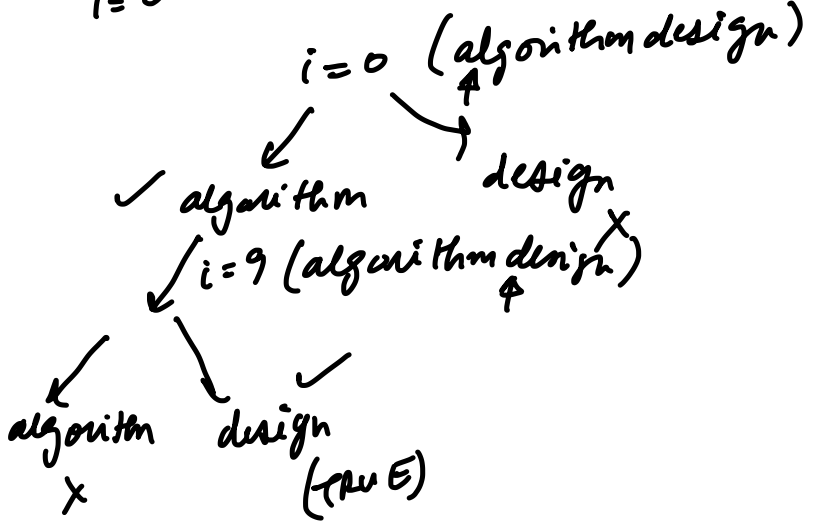
139. Word Break

s = "algorithmdesign"

dict = { "algorithm" , "design" }

index i be the position we are currently at

i = 0



We try to match each prefix with words in dict
If match is found we update index to
index + len(matched_word) and try to find
matching for remaining part of word.

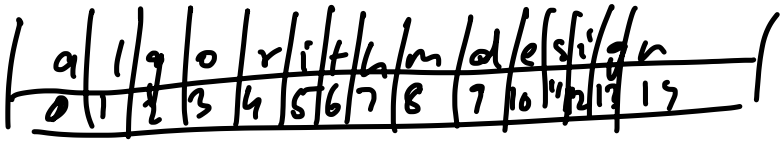
s = "algorithmdesign" len(s) = 15

so we want dp[15] = TRUE

Trying to solve in bottom up

dp[i] = Answer if word i...n can be formed

dp[0] ⇒ gives ans if word 0..n can be formed



dp[15] = TRUE

dp[14] = False

dp[13] = False

dp[12] = False

dp[11] = false

dp[10] = false

dp[9] = dp[9 + len(design)] = dp[9+6] = dp[15] = TRUE

dp[8] = false

dp[7] = false

dp[6] = false

dp[5] = false

dp[4] = false

dp[3] = false

dp[2] = false

dp[1] = false

dp[0] = dp[0 + len(algorithm)] = dp[0+9] = TRUE

Fill

```
dp = [false] * (len(s) + 1)
dp[len(s)] = TRUE

for i in range(len(s), -1, -1):
    for w in dict:
        if (i + len(w) <= len(s) and
            s[i : i + len(w)] == w):
            dp[i] = dp[i + len(w)]
        if dp[i] == TRUE:
            break

return dp[0]
```

O(n) O(M) O(n)

if dp[i] = True then no need to check again if some other word also matches from dict or not

$O(n^2 m)$