University of Wrocław: Data Science - Math and coding problems

Wenjie Hu

July 2022

Task 1:
k = 5
answer: **5** items [89899, 89989, 98899, 98999, 99989]
k = 10
answer:**42** items[8888888989, 8888898899, 8889888989, 8889889889, 8889899899, 8889899999, 8889988999, 8889998899, 8898898889, 8898988999, 8898989989, 8899889989, 8988888989, 8988998899, 8988999889, 8989889899, 8989889989, 8989899889, 8989988899, 8989998989, 8998899989, 8998998889, 8999888899, 8999899889, 9888899899, 9888989899, 9888999899, 9889888889, 9889898899, 9889988989, 9898898899, 9898989899, 9899989999, 9988889899, 9989888899, 9989899999, 9989988989, 9998888989, 9998898989, 9999888989, 9999898889, 9999898999]
code

```
// task1.py
from itertools import product,count

def gen_nums(digit_len):
    num_tuple = list(product((8, 9), repeat=digit_len))
    return [int(''.join(map(str, idx))) for idx in num_tuple]

def is_prime(n):
  if n <= 1: return False
  for i in count(2):
    if i * i > n: return True
    if n % i == 0: return False

def task_1(k=5):
    prime_num = [i for i in gen_nums(k) if is_prime(i)]
    return prime_num

print('k=5:',task_1(5))
print('k=10:',task_1(10))
```

Task 2

Text A: but eeyore was saying to himself this writing business pencils and whatnot over rated if you ask me silly stuff nothing in it
Text A max value(S): 553

Text B: when poohs a w what it was he nearly fell down he was so pleased it was a special pencil case there were pencils in it marked b for bear and pencils marked hb for helping bear and pencils marked bb for brave bear there was a knife for sharpening the pencils and india rubber for rubbing out anything which you had spelt wrong and a ruler for ruling lines for the words to walk on and inches marked on the ruler in case you wanted to know how many inches anything w a sand blue pencils and red pencils and green pencils for saying special
Text B max value(S): 2154

code

```
// task2.py
def wordBreak(words, word, out=''):
    if not word:
        out_score = []
        seg_list.append(out)
        for i in out.split():
            out_score.append(len(i)**2)
        score_list.append(sum(out_score))
        return
    for i in range(1, len(word) + 1):
        prefix = word[:i]
        if prefix in words:
            wordBreak(words, word[i:], out + ' ' + prefix)

words_V = ['h', 'ca', 'go', 'lit', ..... 'but', 'oh', 'tin', 'pen']
Text_A =
    'buteeyorewassayingtohimselfthiswritingbusinesspencilsandwhatnotoverratedifyouaskmesillystuffnoth
Text_B =
    'whenpoohsawwhatitwashenearlyfelldownhewassopleaseditwasaspecialpencilcasetherewerepencilsinitmar
Text =
    [Text_A,Text_B[0:103],Text_B[103:220],Text_B[220:319],Text_B[319:432],Text_B[432:]]
res_text = []
max_values=[]
for i in range(len(Text)):
    seg_list = []
    score_list = []
    wordBreak(words_V,Text[i])
    max_index = score_list.index(max(score_list))
    res_text.append(seg_list[max_index])
    max_values.append(score_list[max_index])
print('Text A:',res_text[0])
print('Text A max value(S):',max_values[0])
```

```
print('Text B:',res_text[1]+res_text[2]+res_text[3]+res_text[4])
print('Text B max
    value(S):',max_values[1]+max_values[2]+max_values[3]+max_values[4])
```

Task 3

answer:

$$\frac{1}{48}$$

Task 4

answer:

$$\frac{1}{10240}$$

Task 5

failed