

# **CSCI3070U: Analysis & Design of Algorithms**

## Assignment 2

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## Part 1)

```
As per stanford document: insertions=1cost, deletions=1cost, substitutions=2cost

string1: spoof
string2: stool
f [ 5 4 5 4 3 4 ]
o [ 4 3 4 3 2 3 ]
o [ 3 2 3 2 3 4 ]
p [ 2 1 2 3 4 5 ]
s [ 1 0 1 2 3 4 ]
_ [ 0 1 2 3 4 5 ]
  _ s t o o l
Minimum edit distance of the two strings is: 4

string1: podiatrist
string2: pediatrician
t [ 10 9 10 9 8 7 6 5 4 5 6 7 8 ]
s [ 9 8 9 8 7 6 5 4 3 4 5 6 7 ]
i [ 8 7 8 7 6 5 4 3 2 3 4 5 6 ]
r [ 7 6 7 6 5 4 3 2 3 4 5 6 7 ]
t [ 6 5 6 5 4 3 2 3 4 5 6 7 8 ]
a [ 5 4 5 4 3 2 3 4 5 6 7 8 9 ]
i [ 4 3 4 3 2 3 4 5 6 7 8 9 10 ]
d [ 3 2 3 2 3 4 5 6 7 8 9 10 11 ]
o [ 2 1 2 3 4 5 6 7 8 9 10 11 12 ]
p [ 1 0 1 2 3 4 5 6 7 8 9 10 11 ]
_ [ 0 1 2 3 4 5 6 7 8 9 10 11 12 ]
  _ p e d i a t r i c i a n
Minimum edit distance of the two strings is: 8

string1: blaming
string2: conning
g [ 7 8 9 8 9 10 9 8 ]
n [ 6 7 8 7 8 9 8 9 ]
i [ 5 6 7 8 9 8 9 10 ]
m [ 4 5 6 7 8 9 10 11 ]
a [ 3 4 5 6 7 8 9 10 ]
l [ 2 3 4 5 6 7 8 9 ]
b [ 1 2 3 4 5 6 7 8 ]
_ [ 0 1 2 3 4 5 6 7 ]
  _ c o n n i n g
Minimum edit distance of the two strings is: 8
```

## Part 2)

```
original array:
[ 123456 901293 12 235 3456 456 5678 679 9 67890 1 89012 90123 ]

Sorted array:
[ 1 9 12 235 456 679 3456 5678 67890 89012 90123 123456 901293 ]
```

### Part 3)

```
Total value in knapsack: $110  
  
Item5: $12/1w, %100 included  
Item6: $32/4w, %100 included  
Item1: $20/5w, %100 included  
Item4: $22/7w, %100 included  
Item2: $45/15w, %53.3333 included  
Item3: $15/10w, %0 included
```

### Part 4)

```
CHARACTER FREQUENCIES-----  
Character: \n Count: 6  
Character: a Count: 45  
Character: b Count: 13  
Character: c Count: 12  
Character: d Count: 16  
Character: e Count: 9  
Character: f Count: 5  
Document size before using prefix codes: 848 bits (Assuming 8-bit ASCII encodings)  
  
CHARACTER PREFIX CODES-----  
Character: \n Encoding: 11111  
Character: a Encoding: 0  
Character: b Encoding: 101  
Character: c Encoding: 100  
Character: d Encoding: 110  
Character: e Encoding: 1110  
Character: f Encoding: 11110  
Document size after using prefix codes: 259 bits
```