Assignment 03

Group members:

21k-3881
21k-3897
21k-3911

day/date

Assignment 3 21k-3881, 21k-3897, 21k-3911

a) $X = \{B, T, C, A, B, A\}$ Member 1: Taha

$Y = \{U, B, C, B, D, A, B\}$ Member 2: Subeh

		B	T	C	A	B	A
	0	0	0	0	0	0	0
U	0	0	0	0	0	0	0
B	0	1	1	1	1	1	1
C	0	1	1	2	2	2	2
B	0	1	1	2	2	3	3
D	0	1	1	2	2	3	3
A	0	1	1	2	2	3	4
B	0	1	1	2	2	3	4

LCS: B, C, B, A

b) X: Taha LCS

Y: Subeh

ccs = h

		T	A	h	a
	0	0	0	0	0
S	0	0	0	0	0
u	0	0	0	0	0
b	0	0	0	0	0
e	0	0	0	0	0
h	0	0	0	1	1

$\because x + y - LCS$

$= 8$ SubeTaha

day/date

21k-3897 21k 38911 21k-3881

C) arr[] = {7, 10, 2, 1, 20} 3897, 38911

temp[] = {1, 1, 1, 1, 1}

j i
7, 10, 2, 1, 20

7 < 10

⇒ temp[1] = temp[0] + 1 (1, 2, 1, 1, 1)

j i
7, 10, 2, 1, 20

7 ! < 2

10 ! < 2

j i
7, 10, 2, 1, 20

7 ! < 1

10 ! < 1

2 ! < 1

2 < 20 but temp[2] + 1 ! > temp[4]

1 < 20 " " [3] " "

arr: [1, 2, 1, 1, 3]

Max length = 3

j i
7, 10, 2, 1, 20

7 < 20

temp[4] = temp[0] + 1 : (1, 2, 1, 1, 2)

10 < 20

temp[4] = temp[1] + 1 (1, 2, 1, 1, 3)

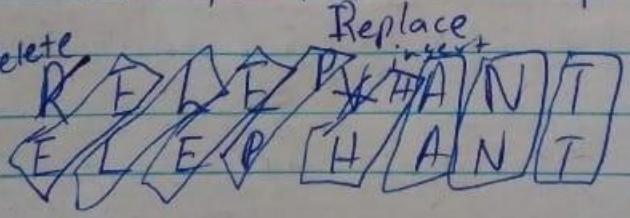
Finally BingO!

(d) "Levenshtein - distance"

$$D[i,j] = \min \begin{cases} D[i-1,j] + 1 & ; \text{Delete} \\ D[i,j-1] + 1 & ; \text{Insert} \\ D[i-1,j-1] + cost & ; \text{Replace} \end{cases}$$

String 1:- Elephant, String 2:- Relevant.

		R	E	L	E	V	A	N	T
	0	1	2	3	4	5	6	7	8
E	1	1	1	2	3	4	5	6	7
L	2	2	2	1	2	3	4	5	6
E	3	3	2	2	1	2	3	4	5
P	4	4	3	3	2	2	3	4	5
H	5	5	4	4	3	3	3	4	5
A	6	6	5	5	4	4	3	4	5
N	7	7	6	6	5	5	4	3	4
T	8	8	7	7	6	6	5	4	3



Total Operations

1 Delete Operation

1 Replace "

1 Insert "

Part (e)

$P_0 \times P_1 \times P_2 \times P_3 \times P_4 \times P_5$; P_5 = AMMAD

$P_5 = 5$

A x B x C x D x E

$p_0 \times p_1$	$p_1 \times p_2$	$p_2 \times p_3$	$p_3 \times p_4$	$p_4 \times p_5$
2×25	25×3	3×16	16×1	1×5

$M[i,j] = \min\{M[i,k] + M[k+1,j] + p_{i-1} p_k p_j$

	A	B	C	D	E
A	0	150	246	173	183
B	0	0	1200	123	248
C	0	0	0	48	63
D	0	0	0	0	80
E	0	0	0	0	0

$A \times B = 0 + 0 + 2 \times 25 \times 3 = 150$

$B \times C = 0 + 0 + 25 \times 3 \times 16 = 1200$

$C \times D = 0 + 0 + 3 \times 16 \times 1 = 48$

$D \times E = 0 + 0 + 16 \times 1 \times 5 = 80$

$ABC = \underset{2\times3}{(AB)}\,\underset{3\times16}{C}$, $A(BC)$

$150 + 0 + 0 + 2 \times 3 \times 16$, $0 + 0 + 25 \times 16 \times 2 + 1200$

246 , 2000

(2×16)

BCD = (BC) D , B (CD)
25x16 16x1 25x3 3x1

= 1200+00+25x16x1 ; 0+0+25x3x1+48
1600, 123
25x1

CDE = (CD) E ; C (DE)
3x1 1x5 3x16 16x5

48+00+3x1x5 ; 0+0+3x16x5+80
63 ; 320
3x5

ABCD = (ABC) D , A (BCD)
2x16 16x1 2x25 25x1

246+0+0+2x16x1, 0+0+2x25x4+123
278 , 173
2x1

BCDE = B (CDE) ; (BCD) E
25x3 3x5 25x1 1x5

0+0+25x3x5+63; 123+0+0+25x1x5
438 ; 248
25x5

ABCDE = (ABCD) E , A (BCDE)
2x1 1x5 2x25 25x5

173+2x1x5+0+0; 0+0+2x25x5+248
183 ; 498
2x5

21k-3881
21k-3911
21k-3897

f) Value = $V_i = \{1, 4, 5, 7, 4\}$
Weight = $W_i = \{1, 3, 4, 5, 2\}$
Capacity = $W = 9$

Vi	Wi	item no.	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	0	1	1	1	1	1	1	1	1	1
4	2	2	0	1	4	5	5	5	5	5	5	5
4	3	3	0	1	4	5	5	8	9	9	9	9
5	4	4	0	1	4	5	5	8	9	10	10	13
7	5	5	0	1	4	5	5	8	9	11	12	13

Formula:

$$V[i,w] = \max\{V[i-1, w], V[i-1, w-w[i]] + P[i]\}$$

$$V[5,8] = \max\{V[4,8], V[4,8-5] + 7\}$$

$$V[5,8] = \max\{10, V[4,3] + 7\}$$

$$V[5,8] = \max\{10, 5+7\}$$

$$V[5,8] = \max\{10, 12\} = 12$$

$X = \{0, 1, 1, 0, 1\}$ Ans

DAA Assignment 3

Group Members:- 21K-3911, 21K-3897,
21K-3381
Names:- Muhammad Ammad, Sabeh Ansari, Taha Jawaid.

Question (g)

Algorithm:-

1) Accept names from the user.
2) Convert names to numbers:-
   2.1) Define a function name_to_nubers which take a string and returns an Integer array.
   2.2) In the function iterate through the String and for each letter provide corresponding numer (A=1, B=2, ..Z=26). and save that number in an Integer Array.
   2.3) After the String iteration is completed return the Integer Array.
3) Do the Same for ~~seco~~ second name.
4) Now take first 3 numbers from name1 and last 3 numbers from name 2 and combine them in a single Array named (Answer).

21k-3881
21k-3911
21k-3887

h) length[] = {1, 2, 3, 4, 5, 6, 7, 8}
price[] = {1, 5, 8, 9, 10, 16, 18, 20}

Rod length = 8

Cut	Profit
8	20
7, 1	18+1 = 19
6, 2	16+5 = 21 ✓
5, 3	10+8 = 18
4, 4	9+9 = 18
6, 1, 1	16+1+1 = 18
5, 2, 1	10+5+1 = 16
4, 3, 1	9+8+1 = 18
4, 2, 2	9+5+5 = 19
3, 3, 2	8+8+5 = 21 ✓
5, 1, 1, 1	10+1+1+1 = 13
4, 2, 1, 1	9+5+1+1 = 16
3, 3, 1, 1	8+8+1+1 = 18
3, 2, 2, 1	8+5+5+1 = 19
2, 2, 2, 2	5+5+5+5 = 20
4, 1, 1, 1, 1	9+1+1+1+1 = 13
3, 2, 1, 1, 1	8+5+1+1+1 = 16
2, 2, 2, 1, 1	5+5+5+1+1 = 17

21k-3881
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21k-3897

3, 1, 1, 1, 1, 1	8+1+1+1+1+1=13
2, 2, 1, 1, 1, 1	5+5+1+1+1+1=14
2, 1, 1, 1, 1, 1, 1	5+1+1+1+1+1+1=11
1, 1, 1, 1, 1, 1, 1, 1	1+1+1+1+1+1+1+1=8

⇒ Highest Profit of 21 in cuts 6, 2 and 3, 3, 2

Ans

i) $S = \{1, 5, 6, 8\}$

Desired Change = 13

Possible Combinations:

⇒ 8+5=13 ← Min : 2 coins

⇒ 5+5+1+1+1=13

⇒ 6+6+1=13

⇒ 8+1+1+1+1+1=13

⇒ 5+6+1+1=13

⇒ 1×13=13

⇒ 6+(1×7)=13

⇒ 5+(1×8)=13

∴ we will select 2 coins i.e (8, 5) to make the change 13

Ans

21k-3881
21k-3911
21k-3897

i) S={ i, like, ice, cream, icecream, mobile, apple}

Input = ilikeapple

⇒ i like apple

		i	l	i	k	e	a	p	p	l	e
	0	1	2	3	4	5	6	7	8	9	10
	0										
i	1	T	F	F	F	T	F	F	F	F	T
l	2		F	F	F	T	F	F	F	F	T
i	3			T	F	F	F	F	F	F	F
k	4				F	F	F	F	F	F	F
e	5					F	F	F	F	F	F
a	6						F	F	F	F	T
p	7							F	F	F	F
p	8								F	F	F
l	9									F	F
e	10										F