Name
Section: 03

[CO2] Suppose, you have $10 to buy food for a day. You have several options, but you need to maximize total calories from the food items for longer survival. Apply proper programming technique to choose the items so that you can have maximum calories from the given amount of money. **You are allowed to waste any food, so if you choose an item, you can eat completely or can eat some portion of the food also.**

Item	Price	Calories
Cheese Burger	$3	250 cal
Pizza	$2	290 cal
Chicken fry	$3	225 cal
Fried rice	$4	295 cal
Salad	$1	200 cal

Maximize: Calorie

(i) Apply proper technique to find the maximum calorie you can eat. [6 mark]
(ii) Write and simulate the algorithm to find the selected items for optimal calorie intake within $10 [2 mark]

i) We will be using Fractional knapsack approach, to solve this problem (which is a Greedy approach)

Item:	Price	Calories	Calorie/price
Cheese burger	$3	250	83.33 *
Pizza	$2	290	145 *
Chicken fry	$3	225	75 *
Fried rice	$4	295	73.75
Salad	$1	200	200 *

item	Calorie	price left	step
~~Salad~~ None	~~200~~ None	10 $	0
Salad	200	9 $	1
Pizza	290	7 $	2
Cheese burger	250	4 $	3
Chicken fry	225	1 $	4
Fried rice	73.75	0 $	5

Total calorie = 1038.75 calories.
Which is the maximum

ii) Algorithm:

loop over table:
~~Pick max price etc~~
Pick max (Calorie/price)
price left -= price
Calorie += Calories
if price left < price:
take fraction until left price
omit the information from the table

Simulate: at step 5, our max Calorie/price was for fried rice, but only $1 was left, so the algorithm chose Calories for 1 $ (fraction).

Suppose you are a gambler; you have brought a lottery game ticket where you need to guess the lottery number. You will receive a "Toyota Premio" if your similarity is 80-89%, a "Toyota Prado" if your similarity is 90-99%, and prize money of "10 Crores TK" if your similarity is 100%. Let's see how fortunate you really are, shall we?
String1(Lottery Answer) = 244663
String2(Your Answer) = 145663

a) [CO6] **Develop/Design** an algorithm to determine the similarity of your lottery number, calculate the percentage similarity between String1 and String2, and calculate your price? (mention the name of the algorithm, show simulation and final calculation with necessary step) [1+5+1]

[Hint: For calculating percentage similarity: Similarity = (Output/Length of the sample) *100]

Solve: We will be using LCS algorithm in this problem which is a dynamic programming approach.

		2	4	4	6	6	3
	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0
4	0	0	1	1	1	1	1
5	0	0	1	1	1	1	1
6	0	0	1	1	2	2	2
6	0	0	1	1	2	3	3
3	0	0	1	1	2	3	4

Seq: 4 4 6 6

output = 4

length of sample = 6

∴ Similarity = $\frac{4}{6} \times 100\% = 66.66\%$

∴ I won't be winning anything at all.