CS pathshala
Bringing computational thinking to schools

Introduction:

Questions: (* questions can be used for evaluation)
1. There are 3 typists. Rita types 15 words a minute, Anita types 16 words a minute and Meena types 20 words a minute. Rita charges Rs 300 per hour, Anita charges Rs 360 and Meena charges Rs 400. Mr X has to get a 12,000 word manuscript typed. Even if part of an hour is used, Mr X has to pay for the hour. Which typist should he use to:
    *   Minimize time taken
    *   Minimize cost incurred
    Hint: use a table as shown below. One row has been worked out for you!

Typist	Words per hour	Hours to complete 12000 words	Cost for total hours
Rita	15 X 60 = 900	12000/900 = 14	14X300 = Rs 4200
Anita			
Meena			

....
....
....
....
....
....
....
....

Name: **Class:**   **Div:**   **Roll. No:**

2. If Mr X can use any 2 typists working together, which 2 should he use to minimize cost? Hint: use a table like below. One pair has been worked out for you!
Rita & Anita – lets start with 5 hours

Hour	Words by Rita	Words by Anita	Total Words	Total Cost
5	4500	4800	9300	660X5=3300
6	5400	5760	11160	660X6=3960
7	6300	6720	13020	660X7=4620

13020 words is more than 12000 so we can stop there.
Note that 13020 – 12000 = 1020 so we cannot reduce the number of hours put in by either Rita or Anita.

....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....

Name: **Class:**   **Div:**   **Roll. No:**

CS pathshala
Bringing computational thinking to schools

....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....
....

3. Suppose you have 5 different things A, B, C, D, E and want to select any 3. How many possible combinations can you have? (Note: 'order' of selection does not matter. i.e., ABC is the same as CAB or ACB)

The 10 options are: ABC, ABD, ABE, ACD, ACE, ADE, BCD, BCE, BDE, CDE.
In general, to select r items from n different items the formula is $rnC = \frac{n!}{r! \times (n-r)!}$

In our example above, $35C = \frac{5!}{3! \times 2!} = \frac{(5 \times 4 \times 3 \times 2 \times 1)}{(3 \times 2 \times 1) \times (2 \times 1)} = 10$

Now the problem: Artist Husain has 6 colours in his palette. He wants to make a painting using any 3 colours. How many possible combinations are there? (Do not list them.)

....
....
....
....
....
....
....
....
....

Name: **Class:**   **Div:**   **Roll. No:**

……
……
………………………………………………………………………Class:……………Div:……………Roll. No:…………
……
……
……
……
……
……
……
……
……
……
……
……
……
……
…………………………………

Name: **Class:**   **Div:**   **Roll. No:**

4. Now Husain wants to make another painting – this time he wants to use only 2 colours from his palette. How many combinations are there? What did you notice about $35C$ and $25C$? Can you generalise it in terms of n & r?

    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....
    ....