National University of Computer and Emerging Sciences

Lab # 2

For

Programming Fundamentals - Lab

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FAST School of Computing

Instructions:

1. Attempt all your questions on a paper, once done scan it with your cell phone and upload the PDF to the portal at Google Classroom.
2. Plagiarism is strictly prohibited.
3. Late submissions are not allowed.
4. This is a pair-programming task, only one person is to submit the solutions.
5. Write your roll numbers, lab#, section and date on the top right corner of the page.
6. You are encouraged to discuss the problem and potential solutions with your partner.

Scenarios:

For all the scenarios given below you are to think of solutions and write them down in the form of a pseudocode. Please follow the syntax taught in the class.

Basic Flows

Question#1

Write a pseudocode to swap two numbers that will be given by the user.

Question#2

FAST calculates the merit points of applicants in the admission processs using the following criteria:

Selection Criteria:

- 50% weight to marks obtained in Admission Test **AND**
- 10% weight of SSC (or an equivalent exam) **AND**
- 40% weight of HSSC (or an equivalent exam)

Rizwan wants to know his total aggregate; can you help him out using a pseudocode?

Question#3

Write a pseudocode to take three numbers from the user and then show their product on the screen.

Question#4

Write a pseudocode to take a number from the user and then show how much is it squared. For instance, if the user inputs 5, you are to show 25 (because 5^2=25).

Too easy? Give this scenario a go (optional)

What if along with the number, the user also gave the exponent in the input, so not only the user would be able to calculate the squares of numbers, they will be able to get the answer to any number raised to the power of any number of their choice.

Sample Input:

4, 3

Output:

$4^3 = 64$

Question#5

Its September 2, and it's the big day! India won the toss and chose to bat, Babar Azam needs your help to compute the required run rates based on different possible targets set by the Indian batting line up, can you help him? He has a range of scores in mind that he would want to compute required run rates against, so that he can tell his bowlers where to restrict the Indian Team.

The Required Run Rate (RRR) in cricket when chasing refers to the average number of runs a batting team needs to score per over in order to successfully achieve the target set by the opposition. It's a measure of the pace at which the chasing team needs to score to win the match.

Question#6

The process of electricity bill calculation is a headache for many consumers in Pakistan, can you help them out by writing a good pseudocode?

The billing process is explained below:

Units Range	Rate Per Unit in PKR
1- 100 Units	16.48
101- 200 Units	22.95
201- 300 Units	27.14
301- 400 Units	32.03
401 - 500 Units	35.24
501 - 600 Units	36.66
601 - 700 Units	37.8
Above 700 Units	42.72

You are to compute the cost of electricity using the above criteria, for instance the user has consumed 240 units, then since 240 falls in the 201-300 Units range then the cost would be:

240 * 27.14

Now you've computed the cost, since the government likes taxes so much why not add a few:

Tax	Criteria
Fuel Adjustment	3%
GST	17%
Extra Tax	5%
Further Tax	7%

These taxes are to be applied on the cost of electricity, then the final bill would be computed and shown on the screen.

Basic Conditionals

Question#1

For question 5 in the previous section, can you modify and ask Babar if the Pakistan has begun batting chasing the score or not, if yes the run rate calculation will differ slightly and then it will help Babar see at what pace should they chase.

Question#2

Assume that Pakistan is batting first now, you are to take an input from the user (the Pakistani captain) of the target they have set, if the set score is greater than 325 then display “Kohli ni hota tujhse chase”, other wise print “Bowlers better bowl well”

Question#3

Create pseudocode to determine whether a person is eligible to vote (considering a voting age of 18).

Question#4

Design pseudocode to check if a person is eligible for a senior citizen discount at a counter (age 60 or above) and if the order total is above $50. You will take the year of birth of the citizen and the amount of the bill. If the bill is above $50 and the citizen is a senior, they are eligible for a discount otherwise not.

Question#5

Write pseudocode to determine if a given number is positive, even, and a multiple of 3.

Question#6

Write pseudocode to decide whether a year is a leap year and whether it's evenly divisible by 100 or not.

Question#7

Create pseudocode to display the name of a month based on its numerical representation (1 for January, 2 for February, etc.).

Bonus Task

Write a pseudocode to swap two numbers without using a third variable.