Assignment 6, CF, 1st Semester

Deadline: Submission acceptable only before Final-Exam paper

Assignment should be hand written.
Write your name, registration No. and section, or else your assignment may not be marked.
Copying is not allowed.
Write in your own words.
Staple your pages properly (binding is not required).
Attempt any 4 questions.

Write pseudocode and draw flowchart for:

1. A program that determines the body mass index (BMI) of the user. The user has to enter own weight in kilograms `W_k` and height in meters `H_m`. The formula for calculating BMI is:

$$\text{BMI} = \frac{\text{W\_k}}{(\text{H\_m})^2}$$

   One of the following four outputs has to be displayed on the screen, depending on the BMI calculation:

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Underweight: less than 18.5
Normal: between 18.5 and 24.9
Overweight: between 25 and 29.9
Obese: 30 or greater
```

2. A program that asks the user to enter two integers `num1` and `num2` such that `num1` is smaller than `num2`, otherwise the user is asked to re-enter the numbers (`do-while` loop). After the loop terminates, the program determines the sum of all the integers starting from and including `num1` up to `num2` (`for` loop). The sum is displayed on the screen (if `num1` is 5 and `num2` is 9, then sum would be 5 + 6 + 7 + 8 + 9 = 35).
3. A program that asks the user to enter two integers `num1` and `num2` such that `num1` is larger than `num2`, otherwise the user is asked to re-enter the numbers (`do-while` loop). After the loop terminates, the program determines the permutation of these numbers using formula $\text{num1}!/(\text{num1} - \text{num2})!$.
4. A program that asks the user to input three integers, determines the average, sum and product of these numbers and displays them on the screen. Also draw the IPO chart for this program along with flow chart and pseudocode.
5. A program where the user is asked to enter an integer and one of the characters 'C' or 'F'. If 'C' is entered, the number is considered as temperature in Fahrenheit, converted to Celsius and displayed on the screen. If 'F' is entered, the number is considered as temperature in Celsius, converted to Fahrenheit and displayed on the screen. In case of other characters, text message "Invalid entry" is displayed.
6. A program that prompts the user to enter a 3-digit number. If the user enters a number with more than 3-digits, or less than 3-digits, the user is asked to enter the number again.

Once a 3-digit number is entered, the number is reversed and displayed on the screen. For example, the user enters 123, then the number 321 is displayed as the output.

7. A program that asks the user to enter an integer as `num_bits`. This integer is considered as the number of bits and has to be converted into bytes. The program calculates the number of bytes as `num_bytes` and remaining bits as `rem_bits`. For example, if the user enters `num_bits` as 60, then `num_bytes` should be 7 and `rem_bits` be 4. In the end, the user is prompted to enter a character `ch`, if 'n' or 'N' is entered, no other calculation is done, otherwise the user is asked to enter `num_bits` again.
8. A program that gives a value of 10 to integer `num`. It uses `while` loop to print the value of `num` followed by a '-' character. The integer `num` is decremented in each iteration of `while` loop. The loop body is executed until `num` is greater than 0. Also determine the output of this program?