Assignment 2 (Conditions)

Submission guideline:

1. SOLVE ALL 18 Problems
2. You have to write each program in separate c file.
3. **Suppose** your student ID – 0112019344
   Then the name of your files will be –
   0112019344_32.c // for problem 32
   0112019344_33.c // for problem 33
   0112019344_34.c // for problem 34
   0112019344_35.c // for problem 35
   0112019344_36.c // for problem 36
   0112019344_37.c // for problem 37
4. Then put all the c files(**only .c files not .exe or .o**) in one folder and rename the folder with your "student ID_Assignment02_Section_ICS_Trimester" (if you are in Spring, write Spring24 in the place of Trimester; if you are in Fall, write Fall24 in the place) and

5. Zip the folder and finally submit the
   0112019344_Assignment02_Section_ICS_Trimester.zip file // or//
   0112019344_Assignment02_Section_ICS_Trimester.rar file

6. Submission deadline : **Check Deadline at ELMS**

7. Please do not copy codes from others or directly from the internet. Each of the assignments will be evaluated with a viva. You must be able to explain your code. Also, we will run a copy checker on the submissions. Any plagiarism will be severely penalized.

Condition Related Problems

(Total 18 questions)

<table>
<tr><th>SL</th><th>Problem statement</th><th>Difficulty levels</th></tr>
<tr><td>32.</td><td>Program that will decide whether a number is positive or not. (Solve using If/else and Switch)

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>100</td><td>Positive</td></tr><tr><td>-11.11</td><td>Negative</td></tr><tr><td>0</td><td>Positive</td></tr></table></td><td>*</td></tr>
<tr><td>33.</td><td>Program that will decide whether a number is even or odd. (Solve using If/else and Switch)

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>50</td><td>Even</td></tr><tr><td>-77</td><td>Odd</td></tr><tr><td>0</td><td>Even</td></tr></table></td><td>*</td></tr>
<tr><td>34.</td><td>Program that will take an integer of length one from the terminal and then display the digit in English. (Solve using If/else and Switch)

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>9</td><td>nine</td></tr><tr><td>0</td><td>zero</td></tr></table></td><td>*</td></tr>
<tr><td>35.</td><td>Program that will check whether a triangle is valid or not, when the three angles (angle value should be such that, 0 < value < 180) of the triangle are entered through the keyboard.

[Hint: A triangle is valid if the sum of all the three angles is equal to 180 degrees.]

<table><tr><th>Sample input</th><th>Sample output</th></tr><tr><td>90 45 45</td><td>Yes</td></tr><tr><td>30 110 40</td><td>Yes</td></tr><tr><td>160 20 30</td><td>No</td></tr><tr><td>0 180 0</td><td>No</td></tr></table></td><td>*</td></tr>
</table>

36. Program that will read from the console a random positive nonzero number and determine if it is a power of 2. **

Sample input	Sample output
1	Yes
512	Yes
1022	No

37. Program that will read from the console a random number and check if it is a nonzero positive number. If the check is yes, it will determine if the number is a power of 2. ***

If the check fails the program will check for two more cases. If the number is zero, the program will print "Zero is not a valid input". Else it will print "Negative input is not valid".

Sample input	Sample output
0	Zero is not a valid input
1	Yes
512	Yes
1022	No
-512	Negative input is not valid

38. Program that will take two numbers **X** & **Y** as inputs and decide whether **X** is greater than/less than/equal to **Y.** *

Sample input (X,Y)	Sample output
5 -10	5 is greater than -10
5 10	5 is less than 10
5 5	5 is equal to 5

39. Program that will decide whether a year is leap year or not. *

Yes, if (Year % 4 == 0 && year % 100 != 0) || (Year % 400 ==0)

Sample input	Sample output
2000	Yes
2004	Yes
2014	No

40. Program that will categorize a single character that is entered at the terminal, whether it is an alphabet, a digit or a special character. *

(**Restriction:** Without math.h)

Sample input	**Sample output**
z	Alphabet
A	Alphabet
8	Digit
*	Special

41. Program that will evaluate simple expressions of the form- **

<number1> <operator> <number2>

; where operators are (+, - , *, /)

And if the operator is "/", then check if <number2> nonzero or not.

Sample input	**Sample output**
100 * 55.5	Multiplication: 5550
100 / -5.5	Division: -18.181818
100 / 0	Division: Zero as divisor is not valid!

42. Program that will take the final score of a student in a particular subject as input and find his/her grade. **(Solve using If/else and Switch)** *

Marks	Letter Grade	Marks	Letter Grade	Marks	Letter Grade
90-100	A	70-73	C+	Less than 55	F
86-89	A-	66-69	C		
82-85	B+	62-65	C-		
78-81	B	58-61	D+		
74-77	B-	55-57	D		

Sample input	**Sample output**
91.5	Grade: A
50	Grade: F

43. Program that will construct a menu for performing arithmetic operations. The user will give two real numbers **(a, b)** on which the arithmetic operations will be performed and an integer number (1 <= Choice <= 4) as a choice. Choice-1, 2, 3, 4 are for performing addition, subtraction, multiplication, division (quotient) respectively. **(Solve using If/else and Switch)** *

Sample input (a, b, Choice)	**Sample output**
5 10 3	Multiplication: 50
-5 10.5 4	Quotient: 0

44. Program that will construct a menu for performing arithmetic operations. The user will give two real numbers **(a, b)** on which the arithmetic operations will be performed and an integer number (1 <= **Choice** <= 4) as a choice. Choice : 1, 2, 3, 4 are for performing addition, subtraction, multiplication, division respectively. **

If Choice: 4 is selected, again the program will ask for another choice (1 <= **Case** <=2), where Case: 1, 2 evaluate quotient and remainder respectively.

Sample input	**Sample output**
5 10 3	Multiplication: 50
-5 10.5 4 1	Quotient: 0
-5 10.5 4 2	Remainder: -48

1. Addition
2. Subtraction
3. Multiplication
4. Division

    1. Quotient
    2. Remainder

45. Program that will construct a menu for performing arithmetic operations. The user will give two real numbers **(a, b)** on which the arithmetic operations will be performed and an integer number (1 <= **Choice** <= 4) as a choice. Choice-1, 2, 3, 4 are for performing addition, subtraction, multiplication, division respectively. ***

If Choice-4 is selected, the program will check if **b** is nonzero.

If the check is true, the program will ask for another choice (1 <= **Case** <=2), where Case-1, 2 evaluate quotient and reminder respectively. If the check is false, it will print an error message "Error: Divisor is zero" and halt. **(Solve using If/else and Switch)**

Sample input	**Sample output**
5 10 3	Multiplication: 50
-5 10.5 4 2	Reminder: -48
-5 0 4	Error: Divisor is zero

46. Program for "Guessing Game": ***

Player-1 picks a number **X** and Player-2 has to guess that number within **N = 3** tries. For each wrong guess by Player-2, the program prints "Wrong, **N-1** Chance(s) Left!" If Player-2 successfully guesses the number, the program prints "Right, Player-2 wins!" and stops allowing further tries (if any left). Otherwise after the completion of **N = 3** wrong tries, the program prints "Player-1 wins!" and halts.

[**Restriction:** Without using loop/break/continue
Hint: Use flag]

Sample input (X, n1, n2, n3)	***Sample output***
5 12 8 5	Wrong, 2 Chance(s) Left! Wrong, 1 Chance(s) Left! Right, Player-2 wins!
100 50 100	Wrong, 2 Chance(s) Left! Right, Player-2 wins!
20 12 8 5	Wrong, 2 Chance(s) Left! Wrong, 1 Chance(s) Left! Wrong, 0 Chance(s) Left! Player-1 wins!

47. Write a program that performs various mathematical operations based on user input. The program takes a character input ('A' or 'a' , 'B' or 'b', 'C' or 'c') representing a specific case, along with three numbers (x, y, z). Depending on the selected case, the program computes different mathematical expressions and outputs the result. *

Requirements:

1. The program prompts the user to input a character representing a specific case ('A', 'B',

or 'C').

2. The program prompts the user to input three double numbers (x, y, z).
3. If the input character is 'A' or 'a', the program calculates the result using the formula: $\sqrt{x} + y^4 + 6 \cdot z$
4. If the input character is 'B' or 'b', the program calculates the result using the formula: integer division of x % y / z. [Hint use type casting]
5. If the input character is 'C' or 'c', the program outputs the ASCII values of the three numbers x, y, and z as characters.
6. If the input character is not 'A', 'B', 'C', 'a', 'b', or 'c', the program outputs "Wrong Input".

The program should display the calculated result or output the ASCII characters based on the selected case. The program terminates after displaying the result or the error message.

Sample input	**Sample output**
Enter Case (A, B or C): a Enter three numbers: 9 3 2	Output: 96
Enter Case (A, B or C): B Enter three numbers: 100 34 2	Output: 16.00
Enter Case (A, B or C): c Enter three numbers: 97 98 99	Output: a b c

48. Write a program where you have to type your own UIU student ID, if the ID is valid, it will ask you to enter your password. Suppose your password is the ASCII value of your nickname. Now it will check whether your password is a positive number or negative or zero. If the password is a positive number, the program will print your date of Birth, otherwise, the program will print Incorrect Password. If the ID does not exist, the program will print Incorrect ID. [Hint: Define ID, Password at top] **(Solve using only Switch case)** **

49. Write a C program to create Simple Calculator using switch case. *