Basic Core Programs

1. **User Input and Replace String Template “Hello <<UserName>>, How are you?”**
    a. **I/P** -> Take User Name as Input. *Ensure UserName has min 3 char*
    b. **Logic** -> Replace <<UserName>> with the proper name
    c. **O/P** -> Print the String with User Name
2. **Flip Coin and print percentage of Heads and Tails**
    a. I/P -> The number of times to Flip Coin. *Ensure it is positive integer*.
    b. Logic -> Use Random Function to get value between 0 and 1. If < 0.5 then tails or heads
    c. O/P -> Percentage of Head vs Tails
3. **Leap Year**
    a. I/P -> Year, ensure it is a 4 digit number.
    b. Logic -> Determine if it is a Leap Year.
    c. O/P -> Print the year is a Leap Year or not.
4. **Power of 2**
    a. Desc -> This program takes a command-line argument N and prints a table of the powers of 2 that are less than or equal to 2^N.
    b. I/P -> The Power Value N. *Only works if 0 <= N < 31 since 2^31 overflows an int*
    c. Logic -> repeat until i equals N.
    d. O/P -> Print the year is a Leap Year or not.
5. **Harmonic Number**
    a. Desc -> Prints the Nth harmonic number: 1/1 + 1/2 + ... + 1/N
    ( ).
    b. I/P -> The Harmonic Value N. *Ensure N != 0*
    c. Logic -> compute 1/1 + 1/2 + 1/3 + ... + 1/N
    d. O/P -> Print the Nth Harmonic Value.
6. **Factors**
    a. Desc -> Computes the prime factorization of N using brute force.
    b. I/P -> Number to find the prime factors
    c. Logic -> Traverse till i*i <= N instead of i <= N for efficiency.
    d. O/P -> Print the prime factors of number N.

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