C++ Programming
For Loops Homework

Mostafa S. Ibrahim
Teaching, Training and Coaching since more than a decade!

Artificial Intelligence & Computer Vision Researcher
PhD from Simon Fraser University - Canada
Bachelor / Msc from Cairo University - Egypt
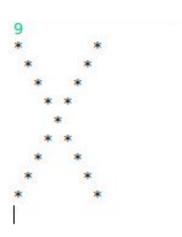Ex-(Software Engineer / ICPC World Finalist)

Homework 1: Printing X

- Read an Integer N, then print an X using * as following
  - N always odd
-

```
5
*       *
  *   *
    *
  *   *
*       *
```

```
9
*               *
  *           *
    *       *
      *   *
        *
      *   *
    *       *
  *           *
*               *
|
```

Homework 2: Find Special Pairs

- Count How many X, Y numbers such that
  - X in range [50-300]
  - Y in range [70-400]
  - X < Y
  - (X+Y) divisible by 7
- Output
  - 8040

Homework 3: Find all quadruples

- Count how many (a, b, c, d) with following property:
  - $1 <= a, b, c, d <= 200$
  - $a + b = c + d$
- Code it once using 4 loops
  - How much time does it take!
- Code it once using 3 loops only
- Future: With hash tables, you can do it using 2 loops only

Homework 4: Is [Prime](#)?

- Read an integer N (< 500) and print YES if it is prime, otherwise NO
  - A prime number is greater than 1 AND cannot be formed by multiplying two smaller numbers.
    - In other words, number%whatever != 0
    - The first few prime numbers are 2, 3, 5, 7, 11, 13, 17, 19, 23, and 29.
- Input ⇒ Output
  - 13 ⇒ YES   (only 1 * 13)
  - 12 ⇒ NO   (E.g. 12 = 2 *6, so 12 can be divided by 2 or 6)

Homework 5: Print Primes

- Read integer N (<500), then print all prime numbers <= N
  - Output should be comma separated, as below
    - Don't print comma after the last number
- Input ⇒ Output
  - 18 ⇒ 2,3,5,7,11,13,17
    - No comma after last number!

Homework 6: [Digits sum](#) in range

- Read three numbers N, A, B. Print the summation of the numbers between 1 and N whose sum of digits is between A and B.
- Input / Output
  - 20 2 5 ⇒ 84
    - Numbers whose sums of digits are between 2 and 5, are: 2,3,4,5,11,12,**13**,14, 20.
      - E.g. digits sum of 13 is 4 : which is between (2, 5)
  - 10 1 2 ⇒ 13
  - 100 4 16 ⇒ 4554

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."