While folks are joining

Get you laptops ready and login to www.crio.do.
We will be coding away in the session!

DSA-1

Session 6

What's for this session?

- Base System (Binary/Octal/Decimal/Hexadecimal)
  - Conversions between them
- Factors and Prime Factors
- Exponentiation
- Problems
  - [Find factors of a given number and their sum](#)
  - [Add two integers represented by strings](#)
 - [Find number of trailing zeros in the Factorial](#)

Base System

- ## What is the Binary System?
  - Base 2 number system. Number system which uses only 0 and 1.
  - How is it represented?
- ## What is the Decimal System?
  - Base 10 number system. Number system which uses 0-9 digits.
  - How is it represented?
- ## What is the Octal System?
  - Base 8 number system. Number system which uses only 0-7 digits.
  - How is it represented?
- ## What is the Hexadecimal System?
  - Base 16 number system. Number system which uses 0-9 digits and A-F characters.
  - How is it represented?

Base System
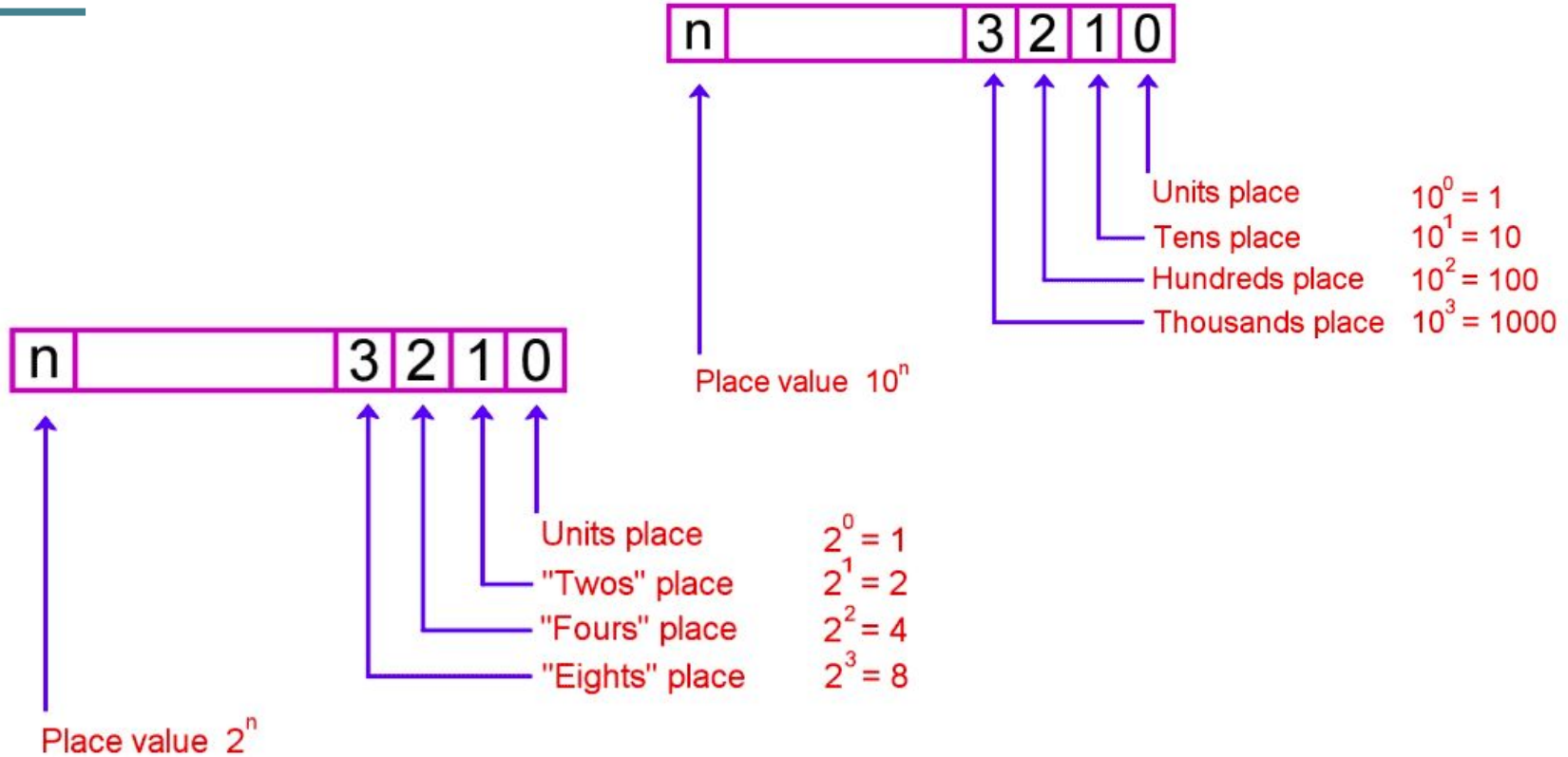
How to convert between different base systems?

- How would you convert a Binary number to Hexadecimal?

- How would you convert a Decimal number to Binary?

Factors and Prime Factors

- **What are Factors of a number?**
  - X is the factor of Y when X can divide Y without any remainder.
  - How would you find them?
- **What are Prime Factors of a number?**
  - A prime number is a number which is divisible only by 1 and itself (2,3,5,7,11,13,17...)
  - A composite number is a number with more than two integral divisors.
  - A factor that is a prime number is a Prime Factor.
  - Is 1 a prime number or a composite number?
  - How would you find them?

How to Approach Problems?

For any given problem, following these milestones will help you solve the problem systematically:

- **Milestone 1** - Understand the problem statement and confirm your understanding with some examples or test cases, including edge cases.
- **Milestone 2** - Think about approaches and select the best one you know. Explain your approach to a 10 year old. Write the pseudocode with function breakdown.
- **Milestone 3** - Expand pseudocode to code
- **Milestone 4** - Demonstrate that the solution works

Activity 1 - Find factors of a given number and their sum

Activity 2 - Add two integers represented by strings

Exponentiation

- What is Exponentiation?
  - The operation of raising one quantity to the power of another.
  - Eg. X^y, 2^3, 4^2
  - How would you implement it?

- What is Modular Exponentiation?
  - Calculates the remainder when exponential term is divided by some other term (mod).
  - $Z = X^y \bmod m$
  - Why is (10^9+7) significant?
  - You'll solve this as part of the Take home.

Activity 3 - Find number of trailing zeros in the Factorial

- One of those problems where you need to know the logic and would be difficult to derive the logic in an interview.

Questions?

Take home exercises

- [Convert number of Decimal to given base](#)

Simple Math Mock Assessment

- [Number of Primes in the given range](#)
- [Modular Exponentiation](#)

To be solved before the next session on Tuesday, 7:30 PM

Feedback

Thank you for joining in today. We'd love to hear your thoughts and feedback.

https://bit.ly/dsa-nps

Thank you