Digital Circuits (2024) - Tutorial Two

Question 1: Consider the following numbers:

- Nineteen
- Thirty-three
- Sixty-nine
- Four hundred

Represent these numbers using the unsigned binary system.

Question 2: Consider the unsigned binary number `10101001`.

- Represent this number in the following numeric systems:
  - Decimal
  - Hexadecimal

Question 3: Consider a four-bit unsigned binary system. Perform the following operations:

- `0011` $\times$ `0011`
- `0011` $\times$ `0101`
- `0111` $\times$ `0010`

Question 4: Represent the number one hundred in numeric systems that use the following bases: 9, 7, 5, 3, and 2.

Question 5: Consider numeric systems with bases 3, 5, 7, and 9. Let each system use three digits.

- How many patterns can be represented by each of these numeric systems?

Question 6: Consider the following numeric systems:

- Eight-bit unsigned binary system
- Sixteen-bit unsigned binary system
- Thirty-two-bit unsigned binary system

- Sixty-four-bit unsigned binary system

Determine the range of values that can be represented by each of these systems.
Question 7: Consider the following set $\{0, 16, 32, 64\}$.

- How many bits are needed to represent the elements of this set using binary patterns?