1 Question: What is the major difference in solving simple problems and complex problems?

- **Answer:** Simple problems can usually be addressed with straightforward solutions and do not require breaking down into smaller parts. Complex problems, on the other hand, are multifaceted; they require decomposing into simpler components, involve multiple variables, and often require iterative processes to solve.

2 Question: Why software designers prefer to use IPO charts?

- **Answer:** IPO charts help in clearly defining the inputs, processes, and outputs involved in a system. This clarity aids in understanding how data moves through an application, simplifying both the design and troubleshooting stages of software development.

3 Question: Differentiate between Computational thinking and Logical thinking.

- **Answer:** Computational thinking involves approaching a problem in a way that a computer can help solve it, including decomposition, pattern recognition, abstraction, and algorithm design. Logical thinking focuses more on deducing solutions through a step-by-step method based on reasoning.

4 Question: Write four properties of Computational thinking.

- **Answer:** The four properties are:
    - **Decomposition:** Breaking complex problems into more manageable parts.
    - **Pattern Recognition:** Observing patterns and trends which can help simplify the problem-solving process.
    - **Abstraction:** Focusing on important information only, and omitting irrelevant details.
    - **Algorithm Design:** Developing a step-by-step solution for the problem.

5 Question: What are the methods used to design a solution?

- **Answer:** Common methods include brainstorming for ideas, using flowcharts to map processes, creating prototypes to explore how elements

of a system interact, and writing pseudocode to outline the functionality before actual coding begins.

6 Question: Which Computational thinking technique breaks down the problem into smaller parts?

- **Answer:** Decomposition is the technique used to break down problems into smaller, more manageable parts, making complex problems easier to solve.

7 Question: Identify 3 computing problems from other subjects that you are studying in your class.

- **Answer:** In math, a problem might involve calculating complex equations which can be solved using computational simulations. In science, modeling ecological systems computationally to predict changes over time could present challenges. In history, analyzing large sets of data for trends could also be problematic.

8 Question: Why do we need to think computationally?

- **Answer:** Computational thinking equips individuals with the ability to tackle large problems, think logically and algorithmically, thus enhancing problem-solving skills which are essential in both academic and real-world scenarios.

9 Question: The telephone numbers usually have 9 digits. Out of these 9, the first two digits represents the area code and are it remained constant within a given area. The last 7 digits represents the number, and it cannot begin with 0. How many different telephone numbers are possible with a given area code.

1. **Answer: Fixed Area Code:**
   - The first two digits are fixed, so we don't have any choices for them.
2. **Variable 7-Digit Number:**
   - The last 7 digits are variable, but there's a constraint: the first digit cannot be 0.

Counting the Possibilities:

- **First Digit:**
  - Since it can't be 0, we have 9 choices (1-9).
- **Second to Seventh Digits:**
  - Each of these 6 digits can be any of the 10 digits (0-9).

Calculating the Total:

- Multiply the number of choices for each digit:
  - 9 (first digit) * 10 (second digit) * 10 * 10 * 10 * 10 * 10 (sixth and seventh digits)
- This equals: $9 * 10^6 = 9,000,000$

Therefore, there are 9,000,000 different telephone numbers possible with a given area code.

123456789=9 Digits

001234567=First 2 are fixed, and 7 are changeable.

001123456=The 3rd Digit can't Be beginning with 0. So, we have 9 choices (1-9).

001123456 = Last 6 digits can be any of the 10 digits (0-9).

$9*10^6=9,000,000$/- Mean 9 Million Combination.

10 Question: From city A to city B, there are 4 different roads and from city B to city C there are 2 different roads. Draw a map of given situation and identify how many possible routes are there that someone can follow to reach from city A to city C passing by city B.

- **Answer:** There are 4 roads from A to B and 2 roads from B to C. The total number of possible routes from A to C via B is 4×2= 8 routes.

Figure: Map of Routes from City A to City C via City B

Map of Routes from City A to City C via City B

A   B   C