Phase 1: Smart Parking

Smart parking makes finding a parking space easy. Sensors in parking lots or on streets detect if a parking spot is empty or occupied. This information is sent to a mobile app or digital signs, showing drivers where they can park. It saves time, reduces frustration, and can even reduce traffic congestion because people spend less time searching for parking. Smart parking also helps cities manage their parking resources better and can lead to more sustainable transportation systems.

Problem definition:

A problem definition is a clear and concise statement that describes a specific issue, challenge, or obstacle that needs to be addressed or solved. It serves as the starting point for problem-solving processes, research, or project planning. A well-defined problem typically includes:

- **A Description of the Issue:** Clearly explain what the problem is and its significance or impact.
- **Scope and Boundaries:** Define the boundaries of the problem to focus on its key aspects and avoid scope creep.
- **Context:** Provide context or background information to help others understand the problem's origins or relevant details.
- **Objectives or Goals:** Specify what you aim to achieve by addressing the problem and the desired outcomes.
- **Constraints:** Mention any limitations or constraints, such as budget, time, or resources, that may affect problem-solving efforts.
- **Stakeholders:** Identify the people or groups who are affected by or have an interest in solving the problem.
- **Measurable Criteria:** If applicable, outline specific criteria or metrics to evaluate the success of the solution.

A well-defined problem statement is essential in various fields, from business and engineering to research and policymaking, as it guides efforts to find effective solutions and ensures that everyone involved understands the problem's nature and objectives.

Design thinking:

Design thinking is a problem-solving and innovation approach that focuses on understanding the needs and perspectives of users to create innovative solutions. It is a human-centered and iterative process that involves the following key stages:

- **Empathize:** In this stage, designers seek to understand the problem from the perspective of the people who experience it. They engage in activities like interviews, surveys, and observations to gather insights and empathize with users' needs and challenges.
- **Define:** Once a deep understanding of user needs is established, designers define the problem statement. This step involves synthesizing the collected information and pinpointing the specific issue that needs to be addressed. A well-defined problem statement serves as a guide for the rest of the process.
- **Ideate:** This stage encourages creative thinking and brainstorming. Designers generate a wide range of ideas and solutions, often using techniques like mind mapping, brainstorming sessions, or "thinking outside the box." The goal is to explore diverse possibilities.
- **Prototype:** Designers create tangible representations or prototypes of potential solutions. These can be rough sketches, physical models, or digital mock-ups. Prototyping allows for testing and refining ideas quickly.
- **Test:** Prototypes are tested with real users to gather feedback and evaluate their effectiveness. This step helps identify what works and what needs improvement. Designers may go back to previous stages to iterate and refine their solutions based on user input.
- **Implement:** Once a solution has been thoroughly tested and refined, it is implemented in the real world. This can involve product development, service delivery, or policy implementation, depending on the nature of the problem.
- **Iterate:** Design thinking is an iterative process, meaning that designers may need to revisit previous stages as new insights or challenges arise. This iterative approach allows for continuous improvement and innovation.

Design thinking is often used in various fields, including product design, user experience (UX) design, business strategy, and social innovation. It places a strong emphasis on empathy, creativity, collaboration, and a willingness to embrace failure as a means of learning and improvement. It has proven to be an effective method for developing user-centered and innovative solutions to complex problems.