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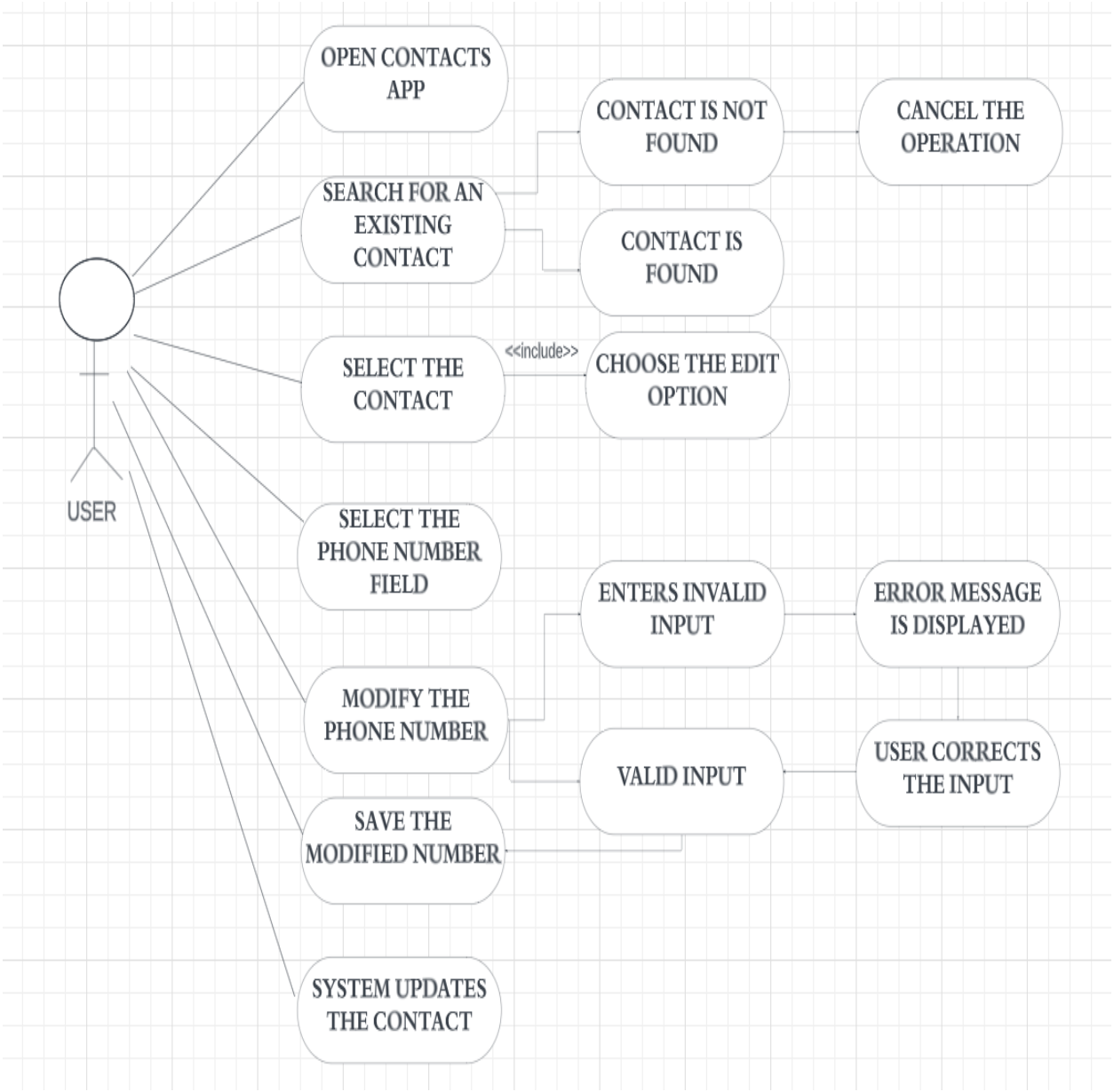
I. Create a use case that models "modify the phone number of an existing contact in your phone's contact list". Show the main flow and at least one alternative and one exceptional flow.



Use Case Title: To modify the phone number of an existing contact

Actor: User

Main Flow:

1. User opens the Contacts App on their mobile device.
2. User selects an existing contact whose phone number they want to modify.
3. User chooses "Edit" option.
4. The user clicks on the phone number field to make changes.
5. User modifies the phone number by making the necessary changes.
6. User saves the changes by clicking on the "Save" button to confirm the changes.
7. The system updates the phone number, with the new value provided by the user.

Alternative Flow - Contact Not Found:

1. User opens the Contacts App on their mobile device.
2. User searches for an existing contact to find the contact they want to modify.
3. If the contact is not found in the search results, the system displays a message indicating the same.
4. User cancels the operation.

Exceptional Flow - Invalid Phone Number:

1. User opens the Contacts App on their mobile device.
2. User selects an existing contact whose phone number they want to modify.
3. User chooses "Edit" option to modify the contact details.
4. The user selects the phone number field to make changes.
5. User attempts to modify with an invalid phone number (e.g., letters, special characters, too many digits).
6. The system detects the invalid input and displays an error message.
7. User corrects the input by entering a valid phone number.
8. User saves the changes by clicking on the "Save" button to confirm the changes.
9. The system updates the phone number, with the corrected value provided by the user.

II.

1. In about half a page, compare and contrast agile and the waterfall process models.

The Agile model follows an **incremental** approach whereas the waterfall model uses a **sequential** process. In the Agile process model, the project is divided into small incremental sprints, these software increments must be delivered in short time periods so that adaptation keeps in pace with change. The main objective of agile model is to **manage complex projects**. On the other hand, in the waterfall model the software development is divided into distinct phases such as communication, planning, modeling, construction and deployment. Waterfall process model is **suitable for small projects**.

In the Agile process model the **development and testing activities go hand in hand**. On the contrary in the case of waterfall model the **testing activities are initiated only after the completion** of development activities.

Agile model is primarily used where **requirements may change** and evolve. It is a **flexible** process model. **Changes can be made** to the project requirements after planning is done. Waterfall model is used when **well-defined** and **stable requirements** are available. **Requirements cannot change** once the project development starts.

Agile mainly focuses on the **working** and **functionality of the project** over tedious documentation (it is usually lightweight) whereas, waterfall model places strong emphasis on **detailed documentation**.

2. When is one preferred over the other, and why?

Agile is better suited for projects involving close and continuous **stakeholder intervention**. **Customer feedback** is a necessity throughout the project.

Agile model is preferred when the **requirements are changing** or not understood in the beginning. It can accommodate changes as the development and deployment activities occur simultaneously. It is used in **highly dynamic** environments.

Waterfall model is suited when there is a **defined end goal**. The customers are confident about the vision of the project and the requirements do not change. Hence, it is used when strict regulations and standards need to be followed.

Waterfall model is preferred when the **budget is fixed** and mostly used for **small projects.** Waterfall model has a **fixed timeline** as the start and end of the project are already mapped out from the beginning.

Agile methodology is used when the project requires a **quick delivery** to the market to gain a competitive edge or time-sensitive opportunity. Agile's iterative approach helps to release a **minimum viable product** (MVP) sooner.

Agile process model allows for **early detection and mitigation of risks** through frequent inspection. This is a must when the projects have a high risk.

Both process models have their own strengths and weaknesses. The choice must be made after clear consideration of the project's characteristics and needs of the organization.