**1. Write the title for an Expert System which you want to build**

**Smart Space Rental System**

**2. Describe its objective**

**Answer:** An artificial expert system is a computer-based decision-making system that uses both facts and heuristics to solve difficult decision-making problems. Artificial Intelligence is a kind of development system that simulates and imitates the behavior and understanding of a human being or an operation that has experts in a particular domain is also known as an expert system. An artificial intelligence system gains various kinds of problem-solving idea and knowledge from its knowledge base and clarifies it according to the user's problem. The data in the knowledge base and it's added by humans that are expert in a particular domain and the software is used by a non-expert user to acquire some information. These expert systems are widely used in many areas such as accounting management, error tracing for debugging codes, programming any games and medical nanotechnological diagnosis, home appliance etc. An expert system is a kind of an AI software that uses knowledge stored in a knowledge base to solve various kinds of problems that would usually require a human expert and by conserving a human expert's knowledge in its knowledge base. These expert systems can advice the non-expert or users as well as provide various explanations to them about how they can reach a particular solution. In summary, we can that these expert systems will give various solutions to the problem of a non- expert or user.

So, in this context I'm going to build and describe an expert system which is known as smart space rental system. Smart space rental system that will use cameras and various kinds of sensors to gather real-time data tracking the space and give information about floor area of the space, the space is available for rental or not, space owners information and building specifications; after measuring all of these things the smart space rental system will alert rental occupancy to the space finder or user. Smart space rental system can easily track and monitor the space to vacant renting spaces based on the information collected and data stored on its system. This system will help to manage the renting spaces easily, resulting in increased revenues as well as time-saving for the space finders and users. Various shop owners need many spaces to open their shops at the nearest of their reliable customers who are eager to shop their daily needs from user's shops near customers home almost every day. To ease this system, shop owners can use this smart AI based space rental system to get their desired spaces for their shops and mini market. In this context, artificial intelligence-based smart space rental system can analyze data such as space types, space rental timings, and frequency to predict future trends and provide a seamless space rental experience over time. And using digital payment methods can also assist in saving time for the space finder and user and help

the space rental operator to run the space renting service lot way easier and efficiently. Smart space rental system plays a significant role in saving time too as the space users and finders can be guided directly to the renting empty space using just a software on his smart device compared to the current scenario where a space finder has to search for an empty space suitable to his space requirements.

**3. Define the individual roles for your expert system**

**Answer:** Defining the individual roles for my expert system:

**Domain Expert:** A successful expert system depends on the experience and real time implementing knowledge that the people can bring to it during its development. Many large systems generally require multiple experts to solve problems. In this, smart space rental system domain expert will to solve various kinds of problems while running the system precise with his mastery. He will check every time whether the system is giving the right solution properly or not and then solve the errors frequently.

**Knowledge engineer:** The knowledge engineer has various kinds of tasks. Knowledge engineer should be able to obtain good knowledge from the experts, bit by bit gaining a good understanding of an area of problem-solving skills. Knowledge acquiring techniques include conducting interviews with varying protocol analysis, observing the experts at work, and analyzing the cases. The knowledge engineer must also select a proper instrument for his project and use it to represent his acquired knowledge with the application of the knowledge acquisition facility. In this, smart space rental system the knowledge engineer will get various kinds of instructions from the domain expert about the errors and then he will develop the system with the expert's solution.

**User:** User is person who will consulting with the system to get various kinds of advice and which would be provided by the experts. A system which is developed by an end user with a simple shell, is built rather quickly and economically. Many large systems are built in an organized development effort. A prototype oriented iterative development strategy is commonly used in expert systems. An expert system lends themselves particularly well to prototyping. The persons who will try to
use the smart space rental system to rent empty spaces are the users of my smart space rental system.

**4. Describe how different components of the expert systems will work**

**Answer:** Describing how different components of the expert systems will work:

**Knowledge Base:** The knowledge base contains domain specific and high-quality knowledge. It is the form of IF-THEN-ELSE rules. The knowledge base is an archive that is full of facts. It stores all the knowledge about the problem domain. It is like a large repository of knowledge which is acquired from different experts.

**Inference Engine:** The inference engine is the main and the processing factor of the expert system. Inference engine contains various kinds of rules to solve a specific problem of a user. It cites the knowledge from the knowledge base. It selects variety of facts and rules to apply when trying to answer the user's various queries. It provides reasoning about the information in the knowledge base. It also helps in reducing the problems to find the real optimal solution. Inference engine is one of the main component in expert systems which is eventually helpful for giving various kinds of ending solution.

**User Interface:** User interface provides interaction between user of the expert system. The user interface is the most key role of the expert system. This key component takes the user's query in an understanding form and passes it to the inference engine. After that, it displays the results to the user. An interface that helps the user to communicate with the expert system to get user's problem solution.

5. **Show an example of using this expert system (dialogue between user and expert system)**

**Answer:** Showing the dialogue between space user and expert system below:

**Space User** Is there any space available for renting?

**System** Type of space you need to rent?

**User** Medium space.

**System** Yes, please let me check for available spaces as your requirements!

**User** Yes!

**System** There is a medium space available as your requirements and you have to wait for 1 month to rent that space.

**User** Yes!

**System** Do you want to rent the space and proceed to next procedure?

**User** Yes!

**System** The space you're renting is Building 1, $5^{th}$ floor. Please make your payment to get receipt!

**User** Yes!

**System** Payment complete. Here's your receipt. Thank you!