Assignment – 1

COVID-19 Tracking Information System

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An E-R diagram is a graphical representation of entities, their attributes, and their relationships. In the case of the COVID-19 tracking system, we can identify several entities that are relevant to capturing the data:

1. Patients: This entity represents individuals who have been diagnosed with COVID-19. It would likely have attributes such as patient name, location, date of diagnosis, and any other relevant information.
2. Hospitals: This entity represents the hospitals where patients are being treated. It would likely have attributes such as hospital name, location, and capacity.
3. Bed: This entity represents bed capacity of the hospital, since there may be different types of beds in a hospital, for example – ICUs, Ventilators, general bed etc. This information is needed to handle sever cases and to estimate the total medical strength of Hospital.
4. Symptoms: This entity represents the symptoms that patients are experiencing. It would likely have attributes such as symptom name, severity, and any other relevant information.
5. Treatments: This entity represents the treatments that are being administered to patients. It would likely have attributes such as treatment name, effectiveness, and any other relevant information.
6. Healthcare Resources: This entity represents the resources that are being used by hospitals to treat patients. It would likely have attributes such as resource name, quantity, and any other relevant information.
7. Citizens: This entity represents the citizens who are reporting information about the pandemic. It would likely have attributes such as citizen name, location, and any other relevant information.
8. Testing Labs: This entity represents the labs that are conducting COVID-19 tests. It would likely have attributes such as lab name, location, and any other relevant information.
9. Vaccination Centres: This entity represents the centres where citizens can receive COVID-19 vaccinations. It would likely have attributes such as centre name, location, and any other relevant information.
10. Social Media Posts: This entity represents the social media posts that are being made by citizens. It would likely have attributes such as post content, date, and any other relevant information.
11. Healthcare Resources: The Healthcare Resources entity in the COVID-19 tracking system refers to the various materials and equipment that are used in the treatment and management of patients with COVID-19, this includes: - oxygen cylinders, PPE kits, Medications, and other medical resources.
12. Geographical Units: This entity could include information about districts and states, which could be used to track the spread of the virus on a regional level.
13. Vaccines: This entity could include information about the different vaccines that are available and have been administered.
14. Corona Variants: This entity could include information about the different genetic variants of the virus that are currently circulating.

15. Healthcare Professionals: This group includes doctors, nurses, and other healthcare workers who are treating patients with COVID-19.
16. Test Result: This entity will contain various test types and test result.

The various features of the COVID-19 tracking system can be supported in the following ways:

- Reporting the prevalence and progress of the pandemic with time: This feature can be supported by the system by collecting and analysing data from various sources, such as hospitalization records, testing lab results, and self-reported information. The system can then generate reports and visualizations that show the number of confirmed cases, deaths, recoveries, and active cases over time, as well as the number of hospitalizations, ICU admissions, and ventilator usage. This information can be presented on a national, state, or district level, depending on the granularity of the data.
- Tracking symptoms and variants that are currently common: This feature can be supported by the system by collecting data on the symptoms reported by patients, as well as data on the genetic sequences of the virus. The system can then use this information to identify common symptoms and track the spread of different variants of the virus. This information can be used to help healthcare professionals make more informed decisions about treatment, as well as to inform public health officials about the spread of the virus.
- Use of healthcare resources and inventory management for future readiness: This feature can be supported by the system by collecting data on the availability and usage of healthcare resources, such as hospital beds, ICU beds, ventilators, and PPE. The system can then use this information to generate reports and visualizations that show the current usage and availability of these resources, as well as to make predictions about future usage. This information can be used to help government officials and healthcare professionals make more informed decisions about resource allocation and infrastructure readiness.
- Contact tracing: This feature can be supported by the system by collecting data on the contacts of infected individuals, as well as data on the location and movement of infected individuals. The system can then use this information to identify individuals who may have been exposed to the virus and to alert them to get tested.
- Other functionalities: The system can be designed to support other functionalities as well, such as providing information about testing and vaccination centres, as well as providing educational materials about the virus and how to protect oneself. Additionally, the system can be integrated with other systems such as electronic medical records (EMR) systems, to provide an integrated view of the patient's health information.

The COVID-19 tracking system is designed to cater to the information needs of three main groups of users:

Citizens: This group includes individuals who are looking for information about the pandemic. They would be able to access information such as the number of confirmed cases, deaths, recoveries, and active cases in their area, as well as information about testing and vaccination centres. They may also be able to access information about symptoms and treatments, and any other relevant information about the pandemic.

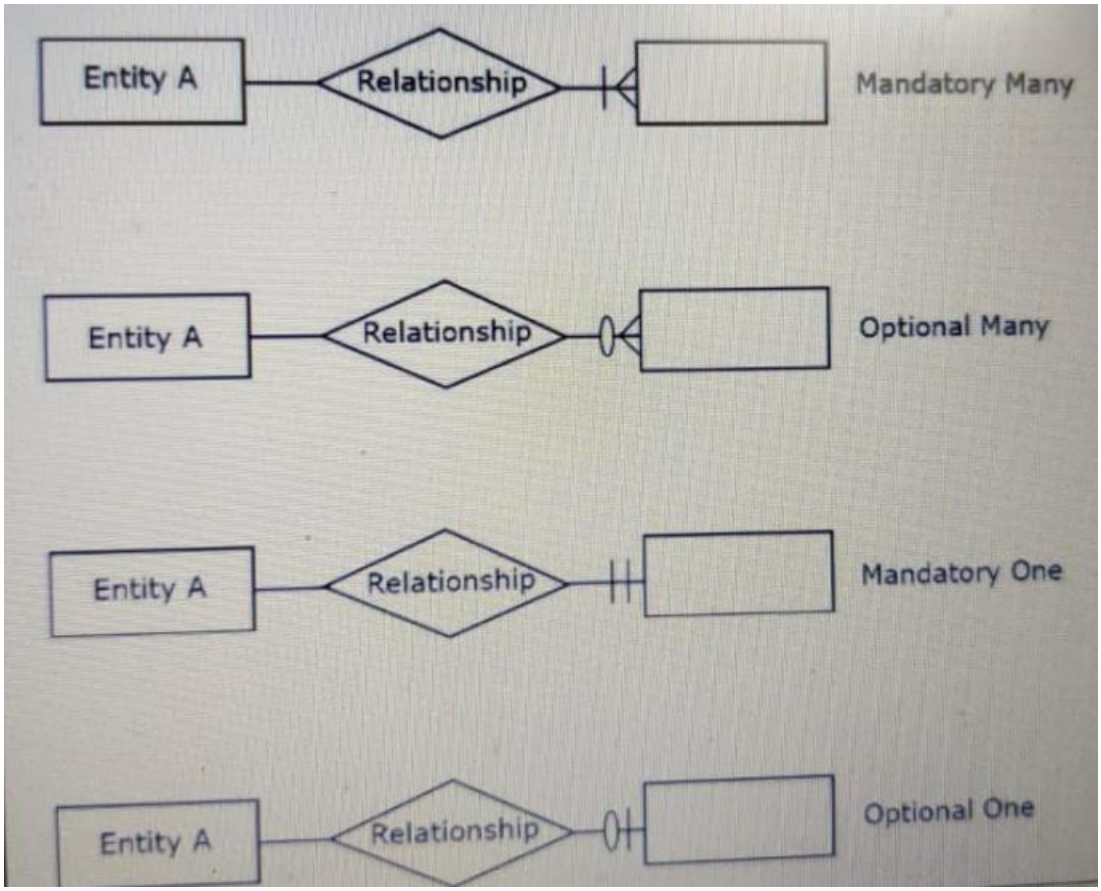
Healthcare professionals: This group includes doctors, nurses, and other healthcare workers who are treating patients with COVID-19. They would be able to access patient profiles, including

information about the patient's symptoms, treatments, and medical history. They would also be able to access information about the disease, such as the latest research and data on the spread of the virus. This information would help them in tracking and treating patients effectively.

Government agencies: This group includes government officials who are responsible for resource mobilization and infrastructure readiness. They would be able to access information such as the number of available hospital beds, ICU beds, and ventilators in their area, as well as information about the availability of healthcare resources such as PPE, oxygen, and other medical equipment. They would also be able to access information about testing and vaccination centres, and any other relevant information that would help them in their efforts to contain the spread of the virus.

All these groups of users would need different types of information, and the system should be designed to provide them with the data they need in an easy-to-use and intuitive way. Additionally, the system should be secure, so that only authorized users can access sensitive information.

There are some standard notations of ER-diagram which we have used are as following: -



And we have used (O) for optional attribute and (FK) for foreign key.