Problem 1: Transportation: Delay management at Howrah Railway Station

Suppose you want to simulate the delay occurred by different trains while arriving at Howrah railway station and allotting them the available platforms for minimization of delay. Your work is to collect data of arrival times of all trains, delays occurred, number of platforms available at the Howrah station, the rail map and the necessary inputs whatever may be required for the simulation process. For data collection you can use the internet and any other medium which you feel comfortable. Your job is to model the input and build simulation model using software's like Anylogic, ARENA, etc. in which you are comfortable. Build a model, do the verification and validation and performance assessment. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 2: Military: Modeling and Simulation of Network Centric Warfare

There are two zones between them war is going on. Each zone contains missiles, tankers, and other war equipment's. All equipment is connected with each other in some fashion. If equipment faces damage up to certain level then the equipment is declared as dismissed. Your work is to build a model of the two zones and by simulation decide which zone will win the battle. For input data you can use arbitrary data by random generation. You can use NetLogo software for modeling and simulation of the problem. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 3: Healthcare: Automatic scheduling of patients in outdoors of hospital

A patient is booking an appointment for consultation with doctor through online/ mobile appointment system. The system provides him a particular day say X and a particular time say Y for consultation with the doctor. When the patient arrives at his schedule time and day he faces too much waiting time before consultation with doctor. Input data may be consultation time for a patient, inter-arrival time between patients, and any other. Your work is to build a model to minimize the waiting time (by providing near exact time of consultation) through simulation taking data from the well-known Hospitals like Appollo. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 4: Police: Vehicle tracking in a road network

In a city a criminal is trying to escape on his vehicle in a road network which has many crossings with each other. Five police vans are chasing and trying to block the criminal. By considering the road network of a particular area of city, try to build a simulation model and find the most probable junctions where the police vans can block the criminal. Take random input like number of junctions, road distance between a pair of junction, number of escaping ways, etc. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 5: Logistics: Truck movement in High-altitude area:

In Himalayan region logistics is carried out through trucks only. In that region very narrow road is available where only one truck can pass at a time. For crossing there are location/junctions at some intervals where the crossing can be done. If two trucks face one another in midway of the road then one truck has to move backward to a location where the crossing is possible. Your work is to build a model for the truck movement in the Himalayan region. Inputs may be number of trucks per day, speed of the truck, number of junction points, etc. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 6: Fog in Delhi: Flight diversion strategy in fog-hit Delhi:

During the winter season there is a huge fog situation in Delhi due to which flights could not land in the Delhi Airport. The Airport authority has decided to divert the flights to other nearby Airports or based on the strategy of the Airport authority. The nearby Airport has their regular flight schedule. Your work is to build a model and simulate for the airport, runway and arrival time. Input data could be collected from the internet. Input data may be number of airports nearby, arrival times of different flights, runways available, etc. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 7: Evacuation planning during Cyclone:

A region is hit by cyclone. Many people are stuck the city. The city has many exist paths. Find a simulation model so that the affected people could escape from the cyclone area in least possible time. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 8: Banking: To detect wilful defaults:

A person takes loan from SBI for buying a home. He has accounts in different banks like Axis, UTI, UBI, CANARA, IOB, PNB, RBI, etc. The person deposits some amount of the loan in any other bank and purchases any product using that bank account. The person willingly does not want to repay the loan to SBI. Now SBI want to catch him by tracing the loan amount investments. The person has money in all his bank accounts. Your work is to build a model based on the situation and find out the money which was loaned from SBI invested by simulation. Take random data for input. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 9: Education: Placement –driven course registration

A candidate has taken admission in IIT Kharagpur. Number of courses has been offered to him and his aim is to get a job. The companies require skilful technocrats in some specific field. The companies do not require master of all fields rather master of specific fields. A number of companies are visiting IIT Kharagpur to place the students. The students have some dream companies they wish to join. Your work is to prepare a model on the situation and simulate the model to develop a list of courses for the specific job. By taking some specific courses the candidate could develop such qualities so that his dream company will accept him. The data could be random. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 10: Faculty flow simulation

Model the flow of faculty in the IIT system. Consider the set of tenure-track faculty members in IIT as customers in queue. The faculty position is available only for PhD holders. Arrivals to the queue are usually assistant professors and departures from the queue are primarily those who do not pass a promotion or tenure hurdle and those who retire. Our focus is on system effects of the elimination of mandatory retirement age. Test the possible conditions like estimating the number of assistant professor slots that annually are no longer available because of the elimination of mandatory retirement. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 11: Airport security check

In international airports, security checks are carried out every day. There are peak time periods when the number of travellers are very large with long

queues. Develop a model to simulate the security checking process in airports. You shall consider the peak and down time periods, number of travellers in queue, time for security check per traveller, arrival and leaving rates etc. in the model. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 12: Container terminal

One of the country's biggest container terminal is situated in South India. Large number of containers arrive by ships to this container terminal every week. Handling and storing these arrived container is to be done by the terminal staff. Develop a model to simulate the storing and handling of containers in the container terminal. Consider the container arrival rate, time to unload the containers from the vessel, storage facility like storage capacity etc. in the model. Apply both discrete and continuous simulation methodologies and compare the results.

Problem 13: Patient arrivals in hospital casualty

The casualty department is the section in a hospital where emergency cases are handled first. This department works 24x7. There are peak times when high numbers of emergency cases arrive. During peak periods, it becomes very difficult to handle the situation in casualty. Simulate a casualty department considering emergency arrival and leaving rates, average time to attend an emergency case, number of patients discharged from casualty, number of patients referred for expert treatment etc. Apply both discrete and continuous simulation methodologies and compare the results.