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Decision Support Systems
Lab 2 Part

1. What is a decision variable?

- Show the alternative course of action and possible solution in certain problems.
- Decision variable is control by decision maker and the value can be the course and action.

2. Define what it means to perform decision making under assumed certainty, risk, and uncertainty.

Certainty:
- All the possible alternative courses and actions are known, all the possible outcome is known and also all the possible future input and outcome are known.
- All the values current and future affecting decision making are known.

Uncertainty:
- Several outcomes for each decision.
- Probability of each outcome is unknown.
- All the exact values affecting decision making is not known.
- Uncertainty are not represent using some form of statistical probability distribution.

Risk:
- Most of the time decision maker will fall in this category.
- All the exact values affecting decision making is not known.
- Typically, will using some form of statistical probability distribution.

3. List some difficulties that may arise when analyzing multiple goals.
- Goals and sub-goals are viewed differently.
- Goals change in response to other changes.
- Dynamics of groups of decision makers.
- The importance of goals changes over time.
- Assessing the importance or priorities.

4. What is the relationship between environmental analysis and problem identification?

- Environmental analysis needs to identify the problem and collect the information to solve the current problem.
- Monitoring, scanning and interpreting information.
- Identify and detect problems/opportunities.

5. List the characteristics of simulation.

- Imitates reality and captures its richness both in shape and behavior.
- Technique for conducting experiments.
- Descriptive, not normative too.
- Often to "solve" for example analyze very complex systems/problems.
- Simulation should be used only when a numerical optimization is not possible.

6. Define heuristics. Why is it necessary to implement heuristic to solve problems related to search?

- Heuristics is a rule of thumb, not a standard rule it is a recommended rule.
- Able to speed the time frame to solve a problem, not that accurate but in certain case it is good enough.
- Informal and judgmental knowledge of an application area that constitute rules of a good judgement.
- Reduce search space and time.

7. Many computer games can be considered visual simulation. Explain why.

- Many computer games be considered visual simulation because have good interactions that allowing users to have feel in the "real" environment.

8. Explain why VIS is particularly helpful in implementing recommendations derived by computers.

- VIS is particularly helpful in implementing recommendations derived by computers because a graphical representation of the solution. It allows the decision makers to see the impact or effect from implementing the recommendations of the recommendations that are implemented in real environment.

9- Consider the user login homepage as the following.

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Case 1 – Both the username and password were incorrect. An
error message is displayed to the user.

Case 2 – The username were right, however, the password was
incorrect. An error message is displayed to the user.

Case 3 – Although the username was incorrect, the password was
accurate. An error message is displayed to the user.

Case 4 – The user's username and password were both accurate,
and the user went to the homepage.
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(a) Identify the decisions, uncertain events, and choices.

Decisions	Uncertain events	Choices
Login and go to homepage	- Username - Password	- Display error messages - Display to homepage

(b) Construct the decision table.

Conditional / Criteria	States of Nature			
User ID	X	✓	X	✓
Password	X	X	✓	✓
Action / Alternatives				
Create error messages	✓	✓	✓	X
Login Homepage	X	X	X	✓

(c) Draw a decision tree based on the answer in (b).
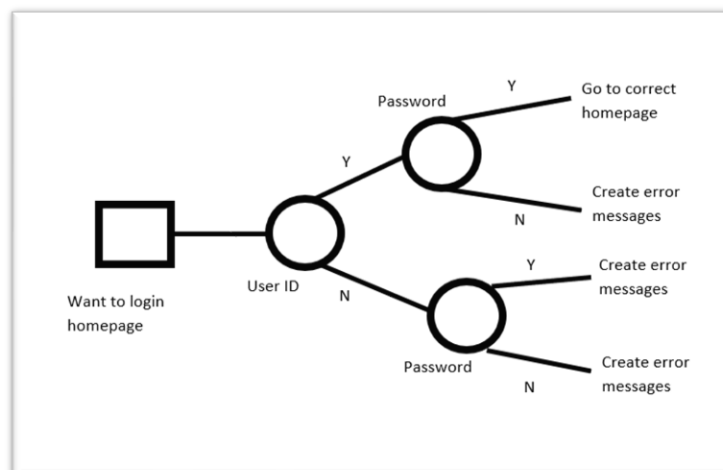
10- Compare between Data Driven DSS and Model Driven DSS.

- A model-driven DSS emphasizes access to and manipulation of a statistical, financial, optimization, or simulation model. Model-driven DSS also use data and parameters provided by users to assists decision makes in analyzing a situation; they are not necessarily data intensive. For examples:
  - A spread-sheet with formulas in
  - A statistical forecasting model
  - An optimum routing model

- A data-driven DSS or also known as data-oriented DSS emphasizes access to and manipulation of a time series of internal company data and, sometimes, external data. Simple file systems accessed by query and retrieval tools provides the elementary level of functionality. Data warehouse provide additional functionality. OLAP provides highest level of functionality. For examples:
  - Collect weather observation at all stations and forecast tomorrow's weather.
  - Collect data on all civilian casualties to predict casualties over the next month.

11- Explain How Business Intelligence can be compared and complement with DSS.

i.   BI implies the use of data warehouse, whereas DSS may or may not have such feature.
ii.   BI are geared to provide accurate and timely information and support DSS indirectly, while DSS are constructed to directly support specific decision making.
iii.   BI has an executive and strategy orientation, while DSS is oriented toward analysts.

12- Explain the competitive advantage can certain company gain by developing their own web-based DSS. (hint: remember the 4 stages of Decision-Making process).

i.   More intelligent in terms of identifying problems and challenges also opportunities and then collecting data and information related to resources, locations, number of workers, the needs
ii.   Better design to create better possible solutions and that can be achieved by collecting sufficient data to be analyzed for better solutions.
iii.   Wider and better choices for example buying software or developing own companies' software solutions.
iv.   Better implementations through selecting the best feasible and alternative solutions and keep monitoring the progress of implementation by continuous monitoring of the services and functionalities as training.