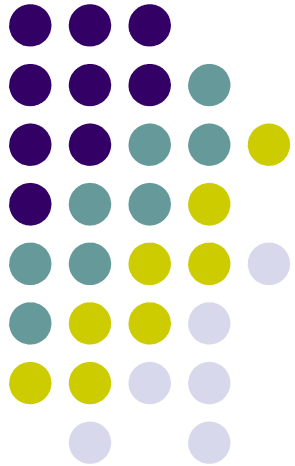
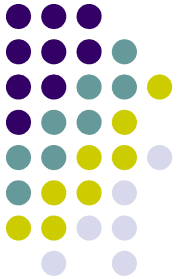
Decision Tables

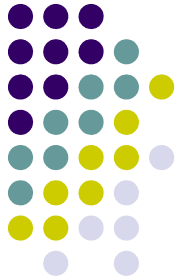


Modeling Logic with Decision Tables



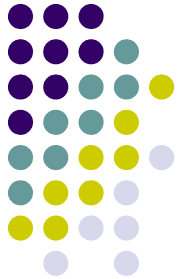
- A matrix representation of the logic of a decision
- Specifies the possible conditions and the resulting actions
- Best used for complicated decision logic

Modeling Logic with Decision Tables



- Consists of three parts
  - Condition stubs
    - Lists condition relevant to decision
  - Action stubs
    - Actions that result from a given set of conditions
  - Rules
    - Specify which actions are to be followed for a given set of conditions

Modeling Logic with Decision Tables

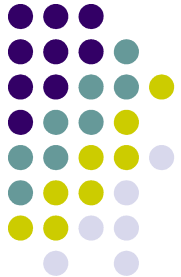


- Indifferent Condition
  - Condition whose value does not affect which action is taken for two or more rules
- Standard procedure for creating decision tables
  - Name the condition and values each condition can assume
  - Name all possible actions that can occur
  - List all rules
  - Define the actions for each rule
  - Simplify the table

Figure 9-4
Complete decision table for payroll system example

	Conditions/ Courses of Action	Rules					
		1	2	3	4	5	6
Condition Stubs	Employee type	S	H	S	H	S	H
	Hours worked	<40	<40	40	40	>40	>40
Action Stubs	Pay base salary	X		X		X	
	Calculate hourly wage		X		X		X
	Calculate overtime						X
	Produce Absence Report		X				

Constructing a Decision Table



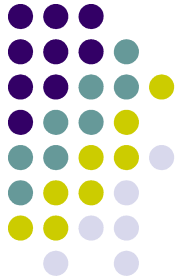
- PART 1. FRAME THE PROBLEM.
  - Identify the conditions (decision criteria). These are the factors that will influence the decision.
    - E.g., We want to know the total cost of a student's tuition. What factors are important?
  - Identify the range of values for each condition or criteria.
    - E.g. What are they for each factor identified above?
  - Identify all possible actions that can occur.
    - E.g. What types of calculations would be necessary?

- PART 2. CREATE THE TABLE.
  - Create a table with 4 quadrants.
    - Put the conditions in the upper left quadrant. One row per condition.
    - Put the actions in the lower left quadrant. One row per action.
  - List all possible rules.
    - Alternate values for first condition. Repeat for all values of second condition. Keep repeating this process for all conditions.
    - Put the rules in the upper right quadrant.
  - Enter actions for each rule
    - In the lower right quadrant, determine what, if any, appropriate actions should be taken for each rule.
  - Reduce table as necessary.

Example

- Calculate the total cost of your tuition this quarter.
  - What do you need to know?
    - Level. (Undergrad or graduate)
    - School. (CTI, Law, etc.)
    - Status. (Full or part time)
    - Number of hours
  - Actions?

From
http://www.depaul.edu/financial_aid/current/current_tuition.asp



- Actions?
  - Consider CTI only (to make the problem smaller):
    - U/G
      - Part Time (1 to 11 hrs.): $335.00/per hour
      - Full Time (12 to 18 hrs.): $17,820.00
      - * Credit hours over 18 are charged at the part-time rate
    - Graduate:
      - Part time (1 to 7 hrs.): $520.00/per hour
      - Full time (>= 8 hrs.): $520.00/per hour
- Create a decision table for this problem. In my solution I was able to reduce the number of rules from 16 to 4.