Webcast on IIPC P7 IT Flowcharts and Decision Table

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What is Programming

A program is the set of detailed instructions which outline the data processing activities to be performed by a computer.

The Process of developing a program is termed as programming.

Programming involves various steps which are:

- Analysis
- Design
- Coding
- Debugging
- Documentation
- Maintenance
What is Algorithm

It is a finite list of instructions specifying a sequence of Operations and that give the answer to any problem.

Computer programs are based on the concept of an algorithm.
What is Flow Chart

- A flowchart is a diagram, prepared by the programmer, of the sequence of steps, involved in solving a problem.
- It represents an algorithm designed to solve a particular problem.
- It is like a blueprint, in that it shows the general plan, architecture, and essential details of the proposed program.
General Symbols

- Start/End
- Input/Output
- Process
- Decision Box
- Connectors
- Document/Print
What is Input and output?

- Input is data required to generate output.
- Output is information generated by program.
- Input is processed to generate output.
- In flowchart input and output are represented by parallelogram.
- Output can also be represented by Print/Document symbol.
What is process

- Process contains one or many steps or instructions that must be followed to generate output from input.
- In general processes in flowcharts involve two kinds of operations
  - Calculations
  - Assignments
How to Draw a Flowchart

Let's make it easy.
Never start drawing a flowchart before clarifying logic or solution.

You always need to perform some working beforehand.

A flowchart starts with input, but logic starts with output.

Understand what output/outputs are required from flowchart.
Process is Everything

- Second step is to derive process to generate desired output.
- Almost every flowchart involve some kind of calculation.
- First list out all formulas for every calculations applicable.
- This will reveal what processing need to be performed.
- Every formula has two sides
  - Left hand side
  - Right Hand side
- These sides separated by =
The Mystery of Input

- The biggest problem faced in drawing a flowchart is what to take as input.
- Previous step solved this mystery.
- In the formula derived in previous step, all variables on right hand side will be taken as input except those that:
  - Derived during calculation
  - Already given in problem
Every thing is solved now

- Now you have Input required, process to be performed and output to be display.
- Start drawing a flowchart with appropriate symbol.
Decision Making

Where to go?
What is Decision?

- It is also termed as branching.
- It is any point in a flowchart from where two course of actions emerges.
- It is represented by a diamond shape.
- It always contain some kind of comparison that is evaluated and yields two branches true (Yes) or false (No) as result.
- Depending upon result any one course of action is followed in flowchart.
Facts to remember

- Consider all decision making factors group them according their applicability.
- Arrange decision making factors according to their priority.
- Draw flowchart accordingly.
- All branches must unite at a single place before end of flow chart.
Iteration or Loop

Toughest to Solve.
What is Loop?

It is any block of statement in flowchart that is repeatedly executed until a condition is satisfied.

Like calculation of average, factorial, compound interest etc.

There are two types of loops

- Counter Based
- User Controlled
Execution of such loops depends upon value of some variable termed as loop controller.

Every time when loop executed, value of controller is checked within body of loop against a predefined value.

If current value of controller satisfies the condition, loop continues to execute else terminated.
Loop controller must be initialized with proper value before start of Loop.

Its value must be altered with appropriate value to achieve final value in order to terminate a loop.

Its current value must be checked within body of loop to determine further execution.
User Controlled Loop

In such loop continuation or termination of loop indicated by user.

User is asked to continue or terminate the loop and appropriate action is taken accordingly.
Accumulation in Loop

Sometimes a solution may need to accumulate result of calculation and display accumulated value at end.

This is performed with the help of one or more variables that accumulates results during execution of loop.

In such case do not forget to initialize value of accumulation variable.
Good Drawing counts

Use right symbol in clear and proper way.

Improper symbols may confuse examiner and affect your result.
A common problem is overflow of text in symbols of flowchart.

For this do not close symbol until you complete the statement need to write.
Use Capital Latters.

It make flowchart easy to read and understand.
You can only use basic arithmetic operations in flow chart.

For example to calculate $X^Y$, you need to implement loop that will run $Y$ times and multiply the value of $X$. 
All ends before end

All braches/ flows must be closed properly before end of flowchart.

Caution: You can not use two end terminators in a flowchart.
Decision Table
**What is a Decision Table**

It is a table which may accompany a flowchart.

It is used to define all possible possibilities that may be considered within the program and the appropriate course of action for each possibility.

It also used to reduces applicable possibilities to minimum.
Components of Decision Table

- **Condition Stub**: It comprehensively lists the comparisons or conditions
- **Action Stub**: Comprehensively lists the actions to be taken along the various possibilities

<table>
<thead>
<tr>
<th>Part 1</th>
<th>C1</th>
<th>Credit limit Okay</th>
<th>Y</th>
<th>N</th>
<th>N</th>
<th>Part 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C2</td>
<td>Pay experience Favourable</td>
<td>-</td>
<td>Y</td>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Part 2</td>
<td>A1</td>
<td>Allow Credit Facility</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Part 4</td>
</tr>
<tr>
<td></td>
<td>A2</td>
<td>Reject Order</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Components of Decision Table - 2

**Condition entries:**
- Which list in its various columns the possible permutations of answer to the questions in the conditions stub.

**Action entries:**
- Which lists the actions to be perform corresponding to the condition entries.
Types of Decision Table

- Limited Entry Table
- Extended Entry Table
- Mixed Entry Table
In a limited entry table the condition and action statements are complete.

The condition and action entries merely define whether or not a condition exists or an action should be taken.

<table>
<thead>
<tr>
<th>Part 1</th>
<th></th>
<th>Granting Credit Facility</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td></td>
<td>Credit limit Okay</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>C2</td>
<td></td>
<td>Pay experience Favourable</td>
<td></td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Part 2</td>
<td></td>
<td>Allow Credit Facility</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td></td>
<td>Reject Order</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>A2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The condition and action statements in an extended entry table are not complete, but are completed by the condition and action entries.

<table>
<thead>
<tr>
<th>Granting Credit Facility</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1           Credit Limit</td>
<td>OK</td>
<td>Not OK</td>
<td>Not OK</td>
</tr>
<tr>
<td>C2           Pay Experience</td>
<td>-</td>
<td>Favourable</td>
<td>Unfavourable</td>
</tr>
<tr>
<td>A1           Credit Facility</td>
<td>Allow</td>
<td>Allow</td>
<td>-</td>
</tr>
<tr>
<td>A2           Credit Action</td>
<td>-</td>
<td>-</td>
<td>Reject Order</td>
</tr>
</tbody>
</table>
Mixed entry form combines both the limited and extended entry forms.

<table>
<thead>
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<th>R1</th>
<th>R2</th>
<th>R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 Credit Limit Okay</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>C2 Pay Experience</td>
<td>-</td>
<td>Favourable</td>
<td>Unfavourable</td>
</tr>
<tr>
<td>A1 Credit</td>
<td>Allow</td>
<td>Allow</td>
<td></td>
</tr>
<tr>
<td>A2 Reject Order</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Steps in Decision Table

- List conditions and actions.
- Combine conditions which describe the only two possibilities of a single condition.
- Make yes or no (Y or N) responses and mark actions to be taken for each rule with X.
- Combine redundant rules to simplify table.
- Check for completeness.
Thank You