Modeling Basics

Steps: Model Building (individually or collectively)

- Start by drawing the Influence diagram.
  - Identify variables and represent them with boxes.
  - Use arrow connectors to link boxes to show how variables influence one another.
  - Use font and shade colors to mark out *Input Variables* (decisions and parameters).
  - Use font and shade colors to mark out *Output Variables* (performance measures and consequence variables).
- Summarize the Influence diagram into a Black-box model.

- Build a simple Excel model based on these two diagrams.
- Refine model by questioning assumptions.

- Analyze *Trade-offs* by changing the values of key controllable inputs (decisions).
- Derive actionable recommendations.

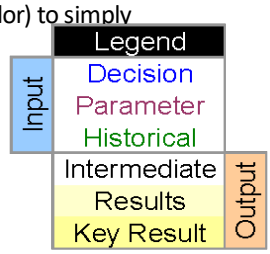
- Perform *Sensitivity Analysis* by changing the values of uncontrollable inputs (parameters).
- Evaluate if recommendations are still valid and add contingency measures
- Clarify the objective, state assumptions and limitations of model.
- Have a clear understanding of how users are to use the model:
  - Draw a UML Use-Case diagram to show the actors and functionalities.
  - Draw a workflow diagram (with swim-lanes if needed) to show the normal work process.

Suggestions: Excel Model Layout and Format

Remember that the spreadsheet model you constructed may not be so easily understood by others and possibly after time not even by yourself if you do not put in some effort to make it user-friendly (in view, use, print and photocopy).

- Present data together (grouping by type) and clearly label them accordingly.
  - Put input cells at the top portion of the worksheet.
  - Put output cells near the top, just below the inputs.
  - Add notes near top to provide information or user instructions to guide the user.
  - Put working tables distinctly at the bottom (so as not to crowd out the inputs and outputs). This also allows the table to be easily extended further below if needed.
  - Add some documentation below that, or to another page on the right, to show formulas of key cells. While the keying **Ctrl + '** toggles the worksheet to show all values or all formulas, having the formulas displayed alongside their values and limiting the formula displayed to only key cells will help you and others better understand the model.
- All input data should be entered only once. Multiple entry of data can lead to errors.
- Store all values in separate cells as data and refer to them in formulas by cell references.
- State unit of measure, where appropriate.

- Use a consistent format scheme (bold/underline/italic font, indent, fill color) to simply model use (for data entry and results intepretation).
- The icon on the right is a suggested scheme: inputs are in blue, violet and green according to whether they are decisions, parameters or historical variables, and outputs are black with the key ones highlighted in increasing brighter shades of yellow.
- Fit the complete model nicely within the computer screen, if possible with minimal need for scrolling.



- Ensure input cells have valid data and protect other cells against tampering:
  - Add **Data/Data Tools/Data Validation** to ensure only appropriate data can be entered.
  - Select input cells (to unprotected), click **Format** in the **Home** tab and tick-off **Locked Cell**.
  - In the **Review** tab, click **Protect Sheet** to activate protection before releasing the workbook to others.

- Try to dress up the worksheet with some simple graphics to make it less intimidating and pleasing to look at. It should still be appropriate and not be overly childish or stoic.
- The choice of colors used must be such that printing or photocopying the worksheet in black and white does not make it less legible.

- In the **Page Layout** tab, click **Print Area/Set Print Area** to specify the part of worksheet that should be printed.
- Click on the other options in the **Page Setup** group to specify page settings.
- In the **Excel Options** in the **Office Button**, it would be good idea to select **Customize** and add **Print Preview** to the **Quick Access Toolbar**.
- Click **Print Preview** to see if worksheet fits nicely on standard paper, and adjust accordingly.

- Your workbook in another computer may not perform as predicted if the application settings there are not the same as your's. Take the necessary actions to rectify.