Week 10: Asynchronous Design Studio
3D Printed Housing Project
PERSEID Method: Validation and Testing

Overview

In this week you will revisit the spreadsheet model that was introduced in Week 5 where you used it to compare different options for various design elements. The model allowed you to specify different parameters and housing configurations and it provided predictions of print time and overall neighbourhood development time (throughput). In this Studio, you will get another chance to review and modify your model and also develop ways to present your model results within your final report and presentation.

Simulation vs. Models

The term simulation and model are frequently used together but there are some subtle differences. A **model** is the actual representation of an engineering object or process typically applying mathematics and computing. For this project, the model is that spreadsheet and all of its associated formulas. A **simulation** is a more complex concept and it refers to the process of using a model to develop a range of predictions to help engineering teams validate, or demonstrate the merits of a design proposition. A simulation is used when the building of an actual prototype is not possible or too expensive, or dangerous. Depending on the nature of a project, simulations can range from simple data output if all you are looking for are discrete calculations, technical graphics, or even 3D visual realizations and animations.

For the 3D printed housing project, your simulation, as a minimum, needs to have the following characteristics:

1. It must be "correct" to the extent that there are no formula mistakes in referring to other cells or values, and any assumptions that you make are based on reasonable research or a reference to a credible source.
2. It must be clearly structured with meaningful descriptive labels, groupings of rows and cells, and additional comments as necessary.

3. You must have used it to help you assess past design choice discussions and your decision matrix assessment from last week[1]. (see footnote)

4. You need organize the sequence of parameter changes and model calculations so that you are not random in your assessments and your model works well to help you create tables of results for your final report.

Step 1: Past PERSEID and decision matrix discussions

Do you think the team used the model effectively during earlier discussions? How might you revisit any of the past discussions to take advantage of the model's prediction ability?

Not exactly. I think the team was too focused on the performance side of the process and lost sight on the true goal of the project: making housing more sustainable. While performance is part of this, it is very important to consider environmental effects and socio-cultural effects, maybe even more than performance. I think we should revisit our weighting discussion to more heavily consider factors outside of performance.

Step 2: Refining and "polishing" the model

How might you improve the model in terms of formula accuracy or considering more factors? Also can you think of ways to improve the appearance and readability of the model results? Note, you do not need to modify the spreadsheet during the Asynchronous portion. You should reflect on possible modifications and then as a group, make the desired changes.

We could improve the model by incorporating the effect on performance for multi-story housing. We can also include weighting of values similar to a design matrix based on public approval of changes made. I.e. multi-story houses would have a higher approval rate than bungalows. We should also incorporate an estimation of waste output due to construction method, material choice, design parameters, etc.

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[1] For example, if local regulations dictate that you can only drive big trucks down specific roads between 10AM and 4PM (i.e. not during rush hours and not in the evenings), how would you adapt your model and how would that effect the project time for a prefab option. For another example, if through your later discussions you concluded that you would prefer to increase the total number of families living in the new neighbourhood thereby preferring multi-family structures, have you confirmed the impact on the development with the model.

Step 3: Pulling together the complete simulation

How might you organize and tabulate model results so that it is easy for readers to interpret your results. Create a possible table structure (just the columns and row labels).

Number of rows and columns are up to you	2 Stories of housing	3 stories
Enviro	4	2
Performance	4	3
SC	2	5

Step 4: Interesting Web site

Visit Cobod Configuratior and experiment a little with this interesting modeling tool. Do you think it might be useful for your design discussion or your final presentation? Using this is not a requirement. It is just something for you to think about.
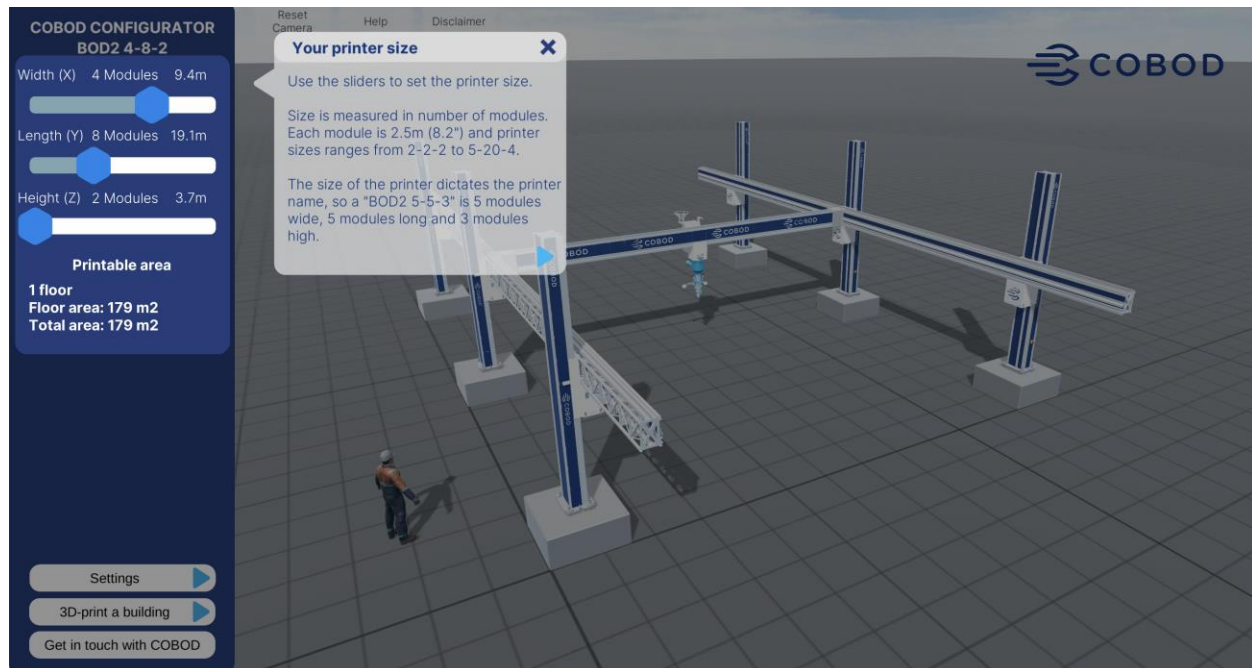
Submission Instructions

1. Upload a *.**PDF** copy of the Wk-10 - Asynchronous Design Studio 10 Worksheet to the Avenue Dropbox titled **Asynchronous Design Studio Week 10** by Friday, March 25th, end of day (5:30pm)
   - Use the following naming convention: **macID_AsynchDS10.pdf**