



Digital Fabrication Project

MINIATURE PAGODA

Project Members

Group Number - 43

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|----------------------|------------------|--|
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Pagoda

- A pagoda is a tiered tower with multiple eaves common to China, Japan, Korea, Vietnam and other parts of Asia.
- The pagoda structure derives from that of the stupa, a hemispherical, domed, commemorative monument first constructed in ancient India.
- Initially, these structures symbolized sacred mountains, and they were used to house relics or remains of saints and kings. Stupas evolved into several distinct forms in various parts of Asia.



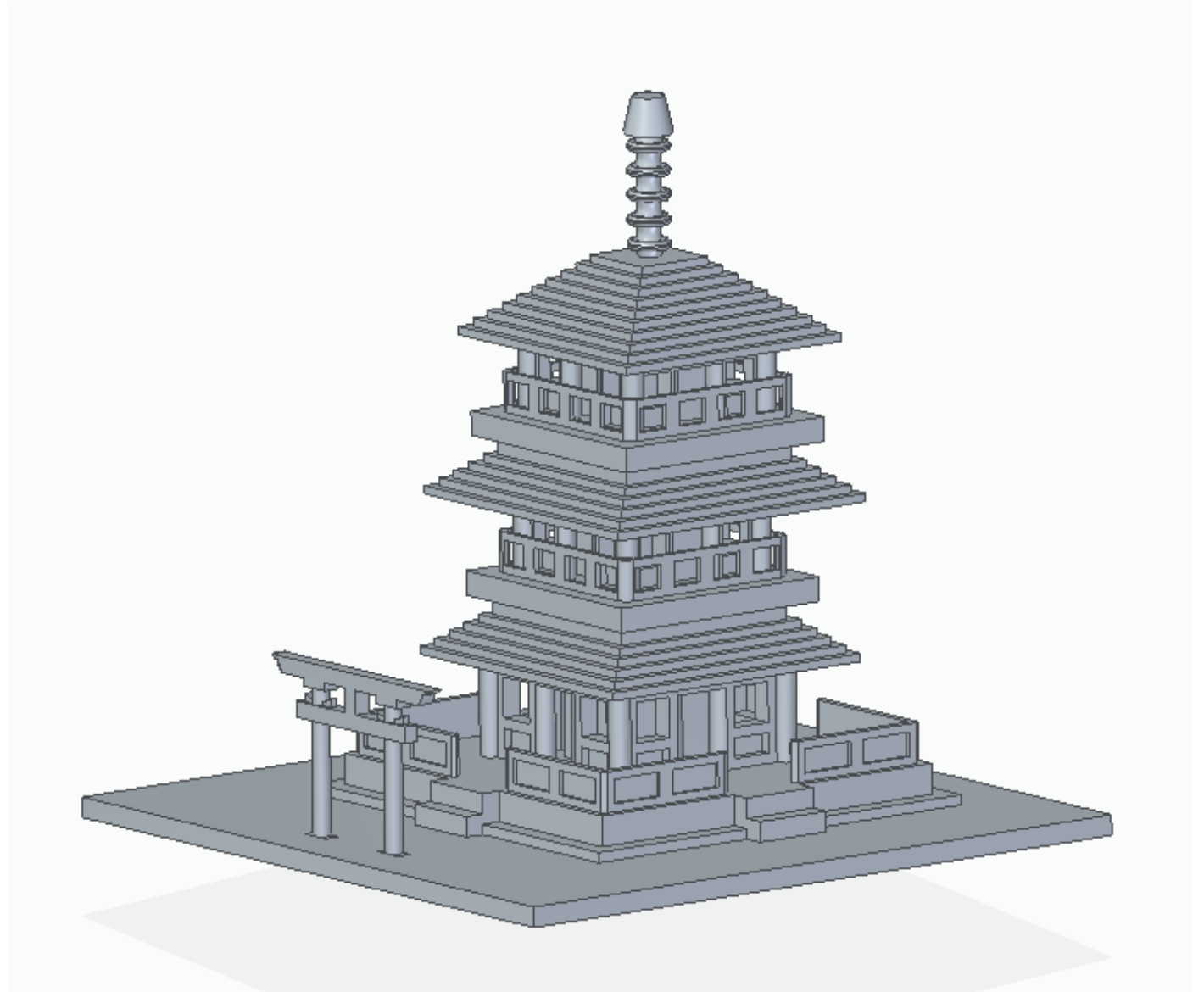
Torii

- A torii is a traditional Japanese gate most commonly found at the entrance of or within a Shinto shrine, where it symbolically marks the transition from the mundane to the sacred.
- The function of a torii is to mark the entrance to a sacred space.
- Torii gates were traditionally made from wood or stone, but today they can be also made of reinforced concrete, copper, stainless steel or other materials.



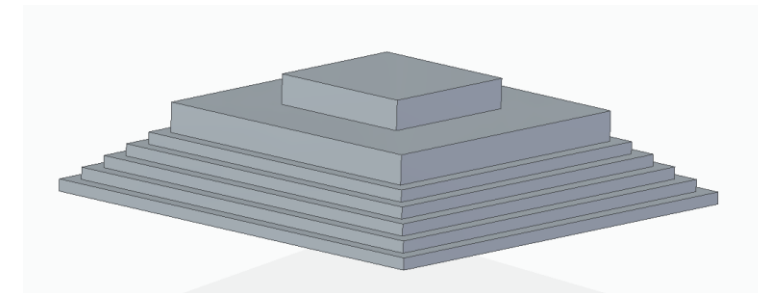
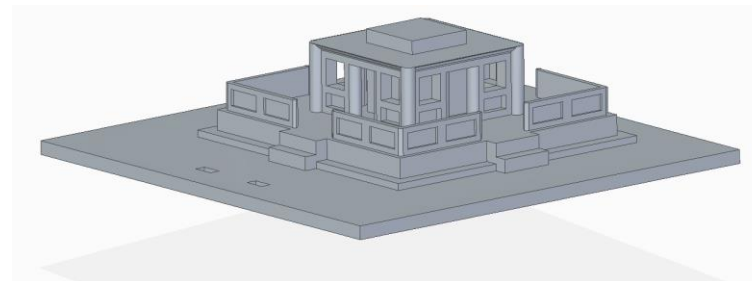
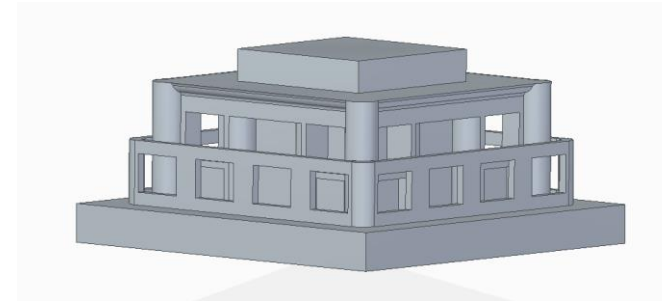
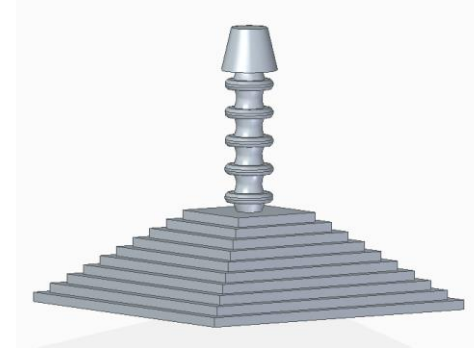
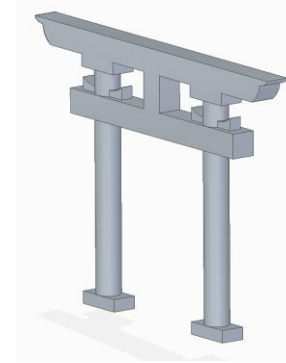
Our 3D Model Project

- Our model is a miniature version of these two architectural structures, the pagoda and the torii.



Some Features of the Project

- The model consists of tiers of the pagoda and the torii as parts which assemble to give the final model.
- All the parts have grooves and extrusions which can be fit into each other to form the miniature pagoda



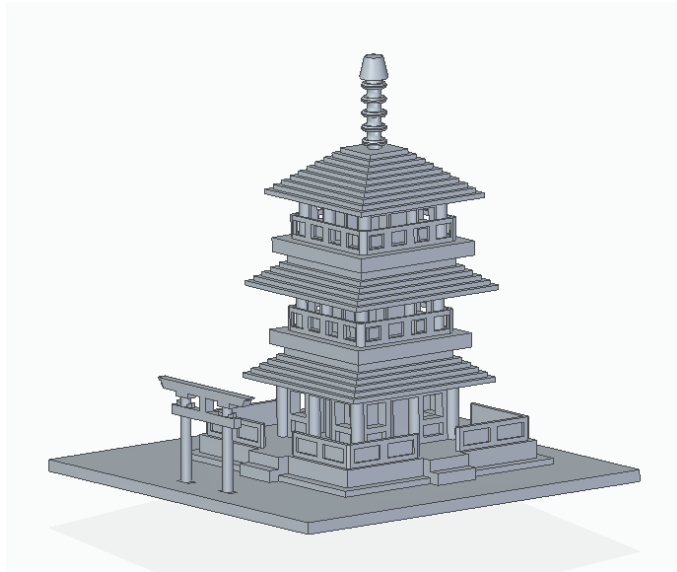
Advantages in the Design

Printing out different parts and assembling them later has several benefits:

- Lesser support material required
- Lower print time
- The model can be customized to add/reduce tiers
- Interaction with the model is increased as the user gets to *build* the model (akin to a Lego model)

Modular Design

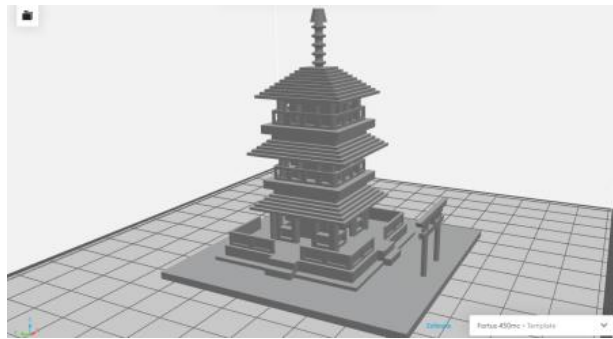
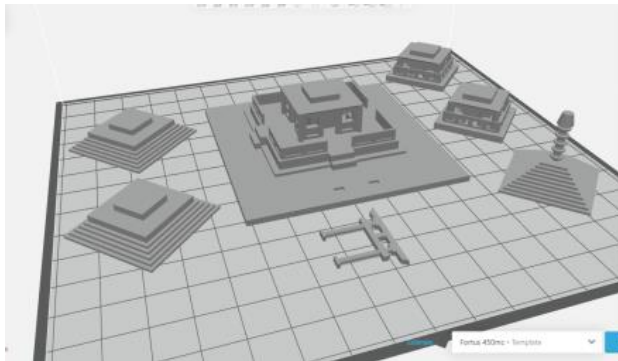
Since the model is divided into smaller tiers/modules, many types of Pagoda can be made with different amounts of the mid-floor and mid-roof printed. Here are some of the examples:



Grabcad Screenshots

Tray Estimations			×
Project	Print Time	11h 57m	
	Model Material (in ³)	23.132	
	Support Material (in ³)	4.97	

Tray Estimations			×
Entire project	Print Time	14h 25m	
	Model Material (in ³)	22.221	
	Support Material (in ³)	6.628	



- The screenshots of the models and trays estimations can be seen on the left.
- The first set is the case where the parts are printed out separately (optimal option).
- The second set is the case where the entire model is printed at once.

Printing Material Reduction

- Since the model has been divided, it can be printed in a way that can avoid excess material when printed as a single model.
- If the model were to be printed in one go, the support material required would be 6.628 in^3
- However, our optimization reduces the volume required to 4.97 in^3 .

Printing Time Reduction

- As mentioned earlier, printing the parts separately also reduces the time required.
- The required time for printing the model in one go is **14h 25m**
- In contrast, the printing time for the optimized model is **11h 57m** , a nearly 3-hour reduction

In conclusion

Our project- The Pagoda 3D model is a showpiece based on a similar Japanese building.

The model was optimized by separating the different parts, printing them out and then assembling them.

This approach reduced both time and support material.

Thank you!