



# Digital Fabrication Project

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MINIATURE PAGODA

# Project Members

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|----------------------|------------------|--|
| •Rahul Aryan         | – CH20BTECH11028 | - Modelling the project                  |
| •Pranav K Nayak      | – ES20BTECH11035 | - Modelling the project                  |
| •Varad Yergole       | – CH20BTECH11038 | - Modelling the project                  |
| •Gautham Bellamkonda | – CS20BTECH11017 | - Collecting time and material estimates |
| •Varenva Upadhyaya   | – EP20BTECH11026 | - Preparing the presentation             |

# Pagoda

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- 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

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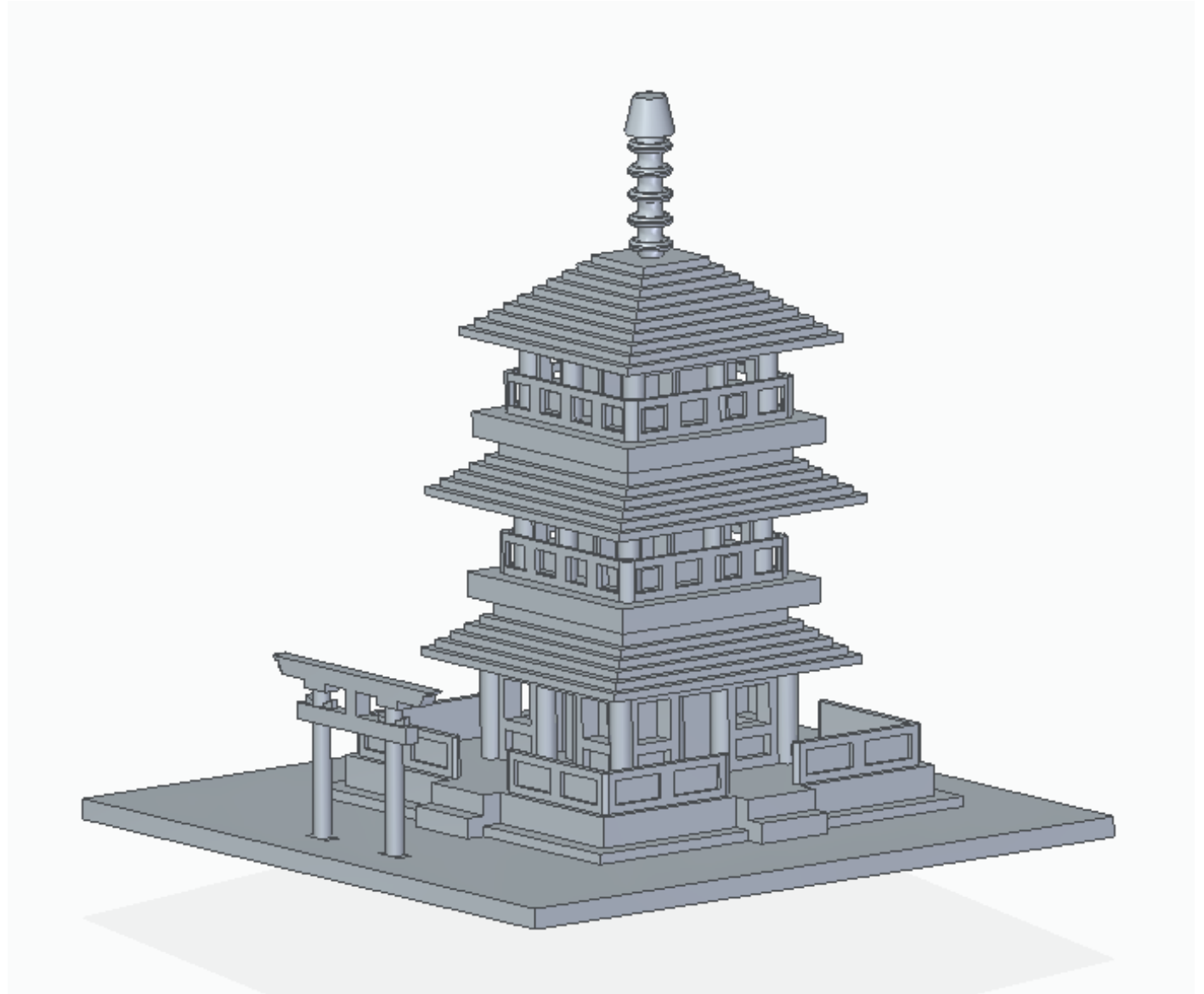
- A torii is a traditional Japanese gate most commonly found at the entrance of or within a Shinto shrine, where it symbolically marks the transition from the mundane to the sacred.
- The function of a torii is to mark the entrance to a sacred space.
- Torii gates were traditionally made from wood or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



# Our 3D Model Project

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

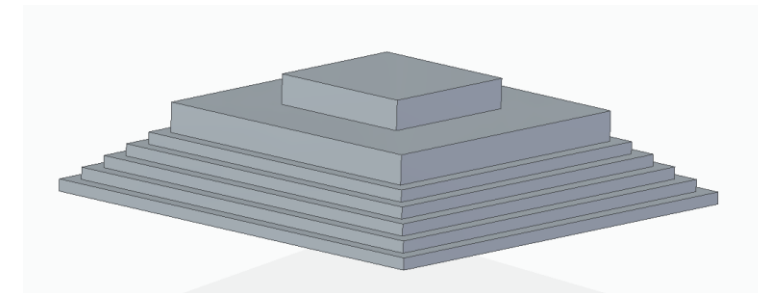
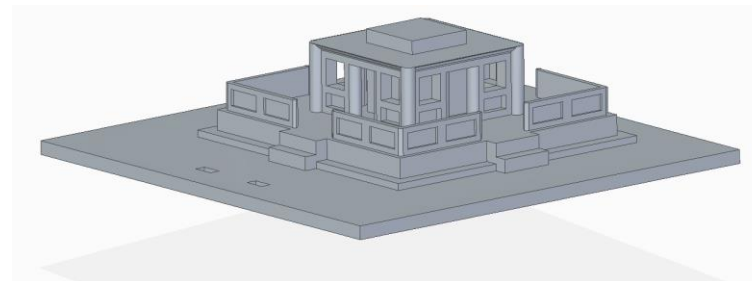
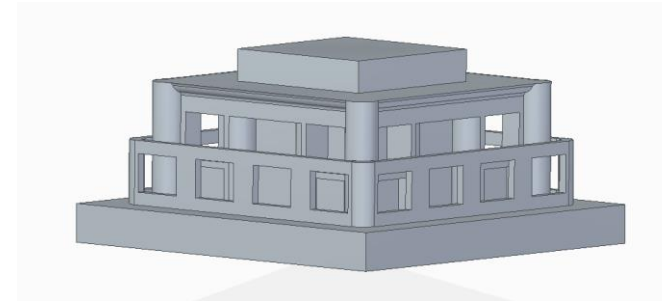
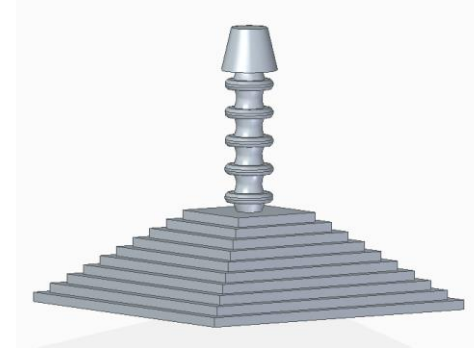
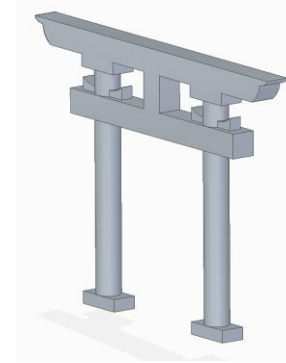




# Some Features of the Project

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- 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

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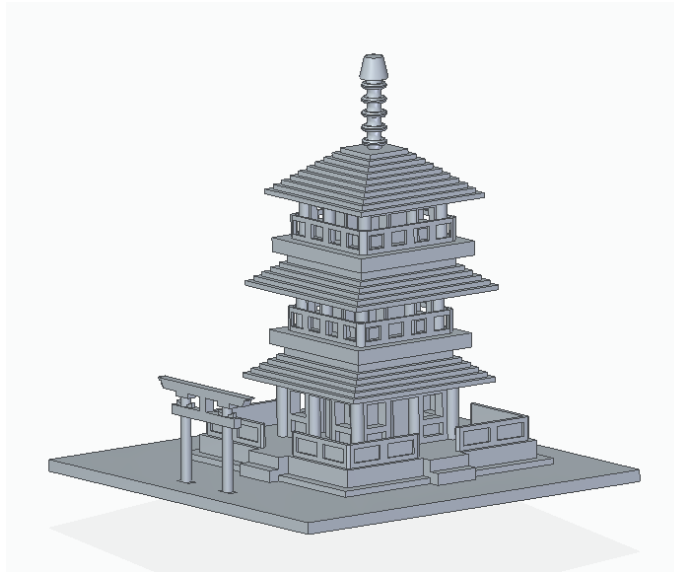
Printing out different parts and assembling them later has several benefits:

- 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

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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:



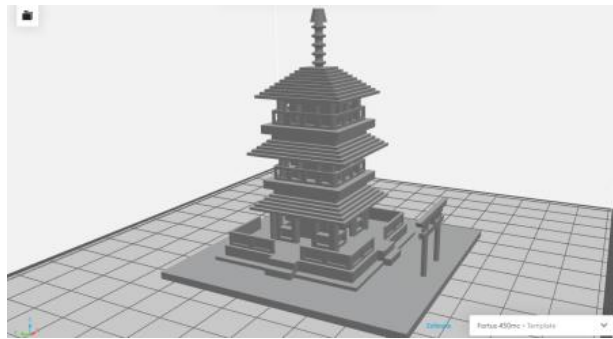
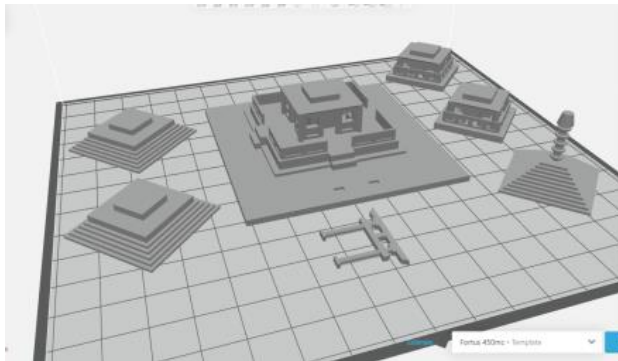


# Grabcad Screenshots

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

Tray Estimations			×
Entire project	Print Time	14h 25m	
	Model Material (in <sup>3</sup> )	22.221	
	Support Material (in <sup>3</sup> )	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

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- 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  $6.628 \text{ in}^3$
- However, our optimization reduces the volume required to  $4.97 \text{ in}^3$ .

# Printing Time Reduction

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- 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

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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!