3D Printing Build Plate Model Arranger

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Background

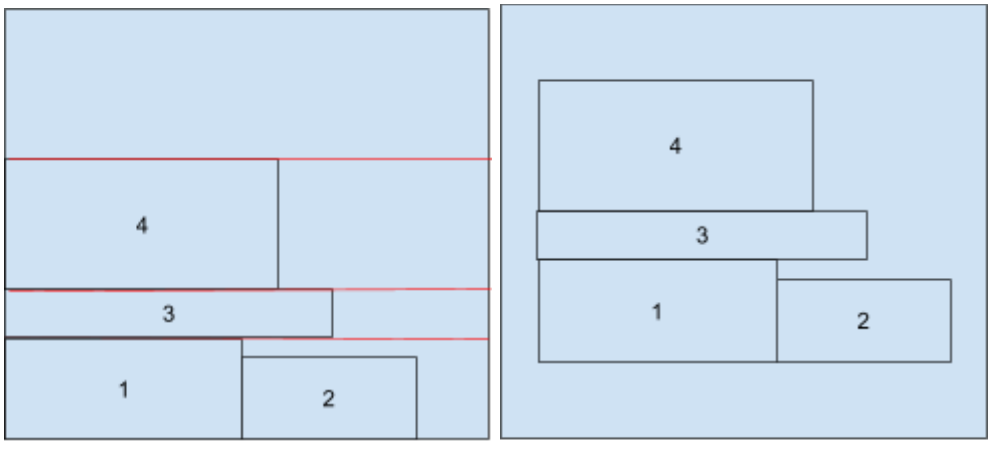
In order to print multiple 3D models at the same time on a 3D printer build plate, we need to arrange the models. Base on my 3d printing experience, it is difficult to print multiple models at the same time due to different models require different printing settings.

It is also not so good to place models so close to each other. I had some experience that one model fall and knocked down a nearby model and failed to print both objects. However, It is still possible to place models that is at least 2 mm between each other by adding 1 mm border to the model dimension, otherwise two models may be stick with each other and it will be hard to cut afterwards. The length of a roll of filament is limited, and it is not easy to estimate if it is enough to print all the objects.

Approach

Placing multiple 3D models on a single build plate is similar to 2D rectangle bin pack problem, we also know that printing objects too close to each other is not a good idea. Therefore, I do not choose any best area fit method.

Shelf's next fit algorithm has been implemented, the plate is being fit from bottom left corner to the right. If the bottom shelf does not fit the next model, then I open a new shelf on the top. After placing all models, we need to move all 3D models to the plate center for better printing quality. The last step is mapping all objects on a build plate with center point set to (0, 0).



Result

The project has been developed using Visual Studio Code with GCC on Ubuntu Linux. I compiled my source code by command “g++ -o ModelArrange -g -I main.cpp *.cpp -std=c++17”

The testing program take a few command line arguments, for example “./ModelArrange 100 100 50 50 40 40 40 40 40 40”