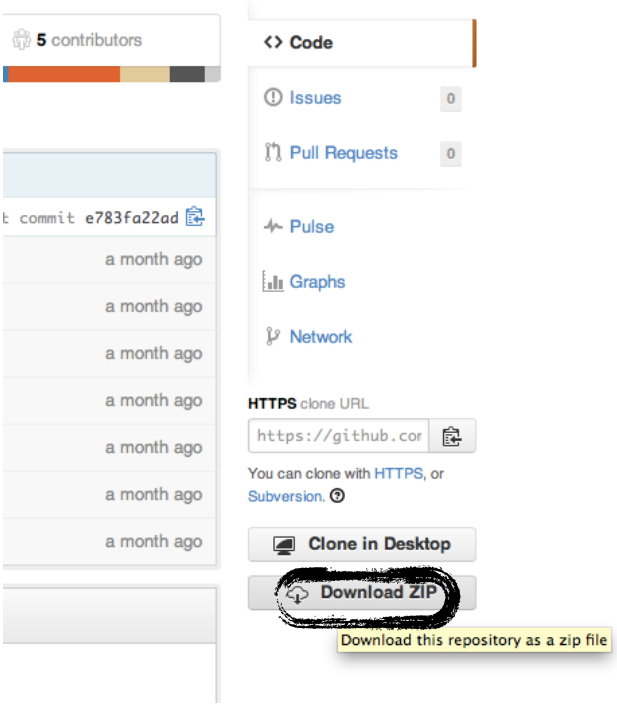
CAST(computer aided synbio tool) combines the design automation, innovative models and algorithms, and wetlab validation, making complex biological systems accessible to researchers who want rapid, intuitive, and high-quality accomplish their designs.

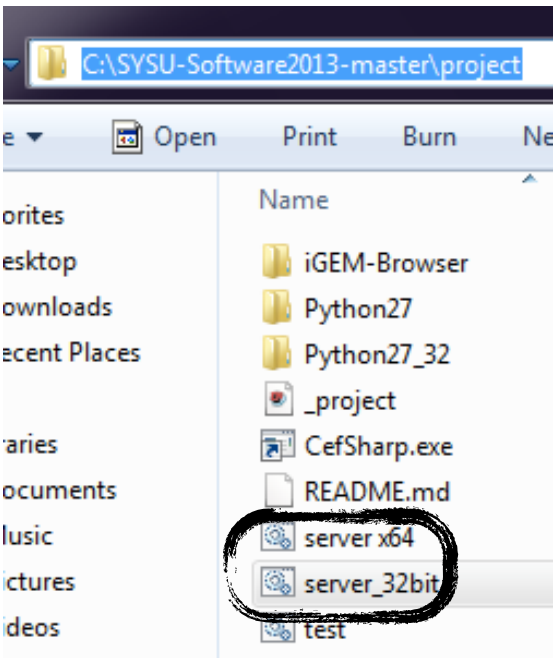
Get started in CAST

I. Download CAST from https://github.com/igemsoftware/SYSU-Software2013

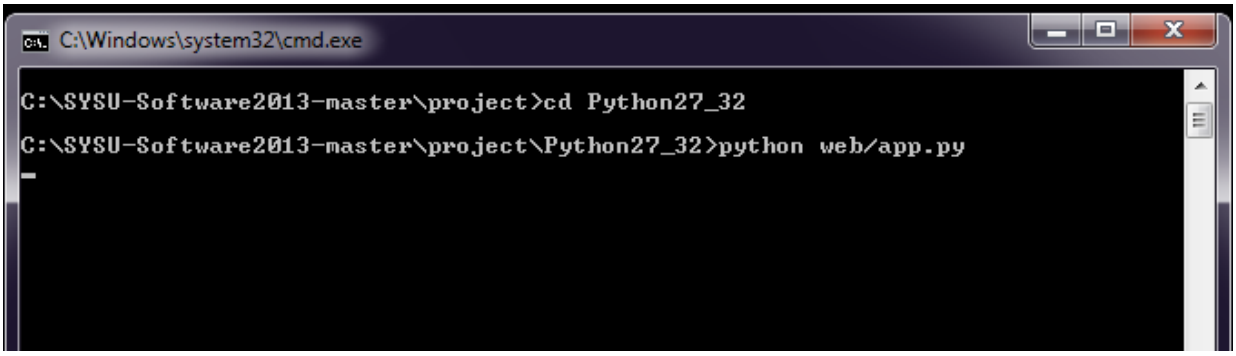


II. Open CAST

1. Open ‘project’ folder in ‘SYSU-Software2013-master’. Then click on one of sever_.bat (choose x64 if your system is 64-bit; otherwise, 32bit is your best choice)



2. It will occur something like this. Just minimize the window.



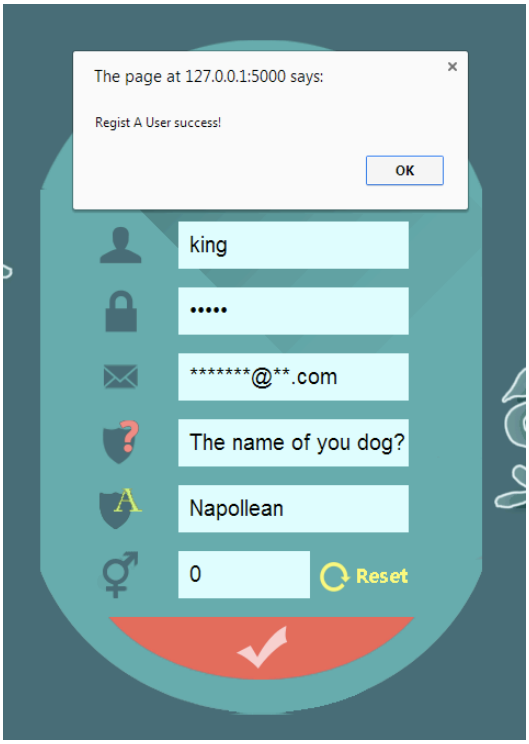
3. Open your browser(such as chrome) and input 127.0.0.1:5000 in the address bar.

4. Sucess!

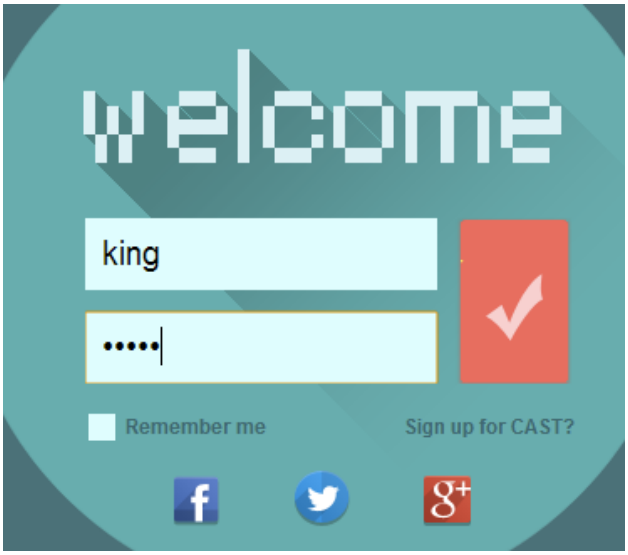
III. Register & Sign in

1. Register if you don't have an account.

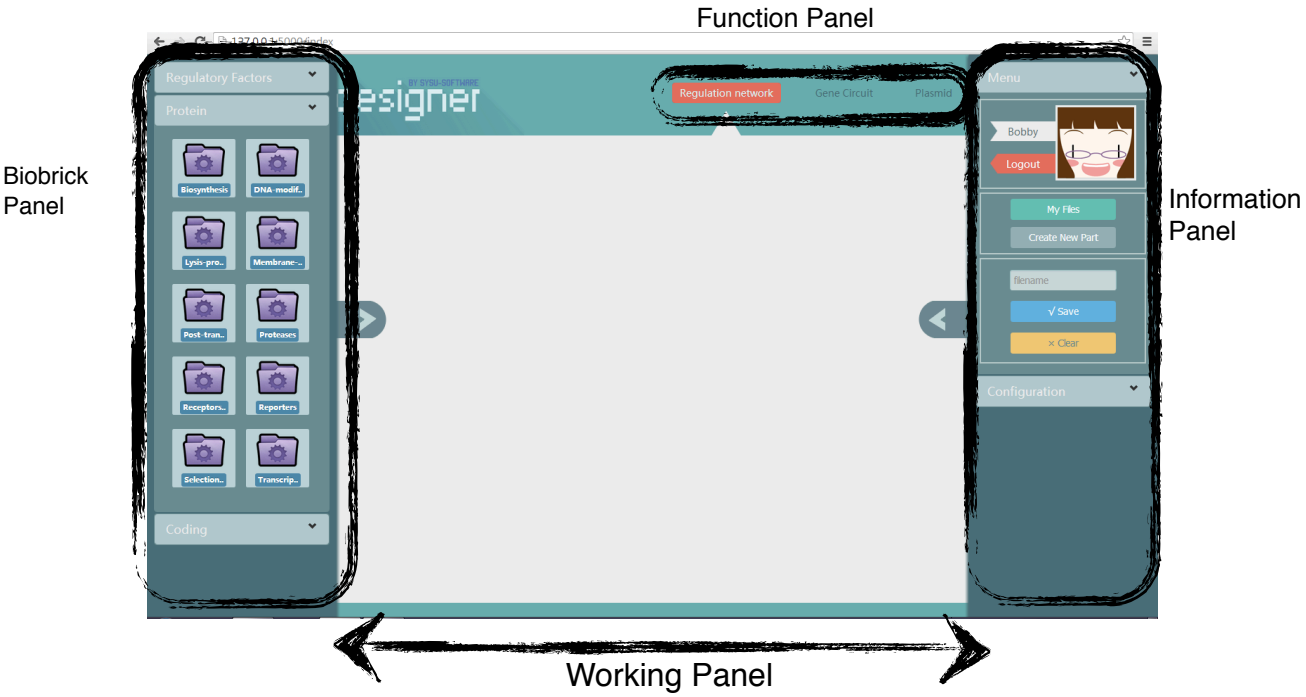
2. Fill in the form and finish signing up. Attention! Gender must be 0(male) or 1(female).



3. Sign in with your username and password.



IV. CAST at a glance



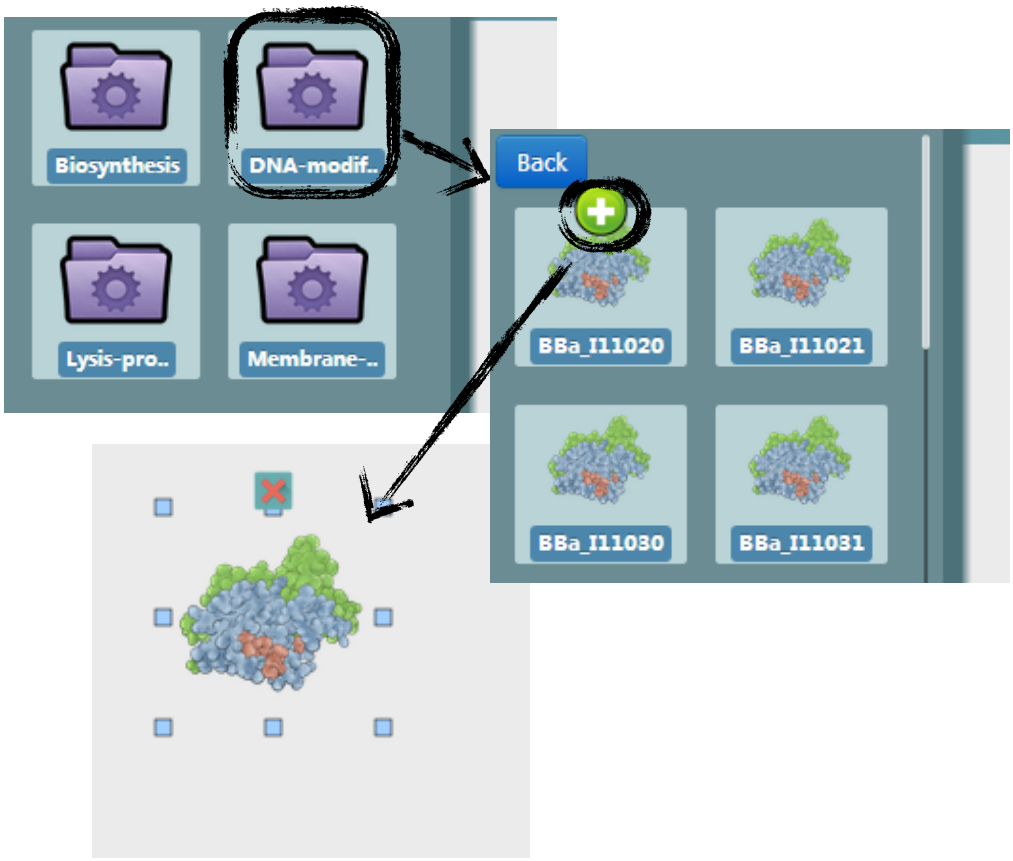
Biobrick Panel: You can choose any biobricks from iGEM registry in ‘Protein’ or your own biobricks in ‘Coding. Apart, regulation factors are available in ‘Regulation Factors’.

Information Panel: You can view your account information in ‘Menu’ as well as details of the biobrick chosen by you.
Function Panel: Select one of the functions and go to next step.
Working Panel: It’s a white paper on which you can draw a regulation network.

Plan Your Experiment

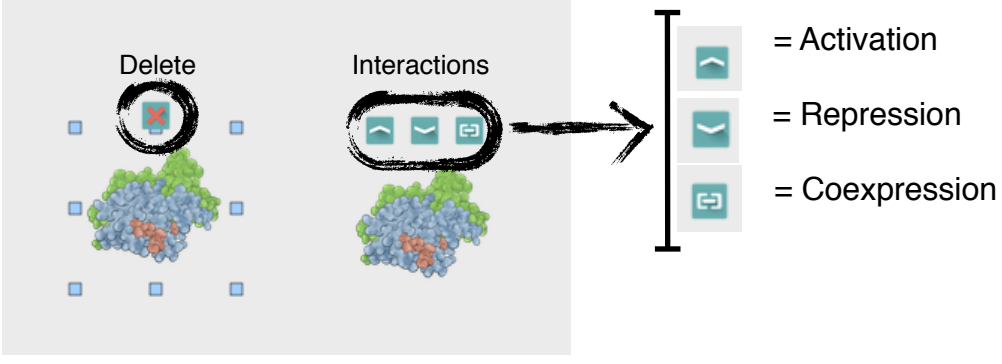
I. **Add biobricks**.

Choose one folder and select the biobrick you need and click on  to add.
(For instance, choose ‘DNA-modification’ -> ‘BBa_I11020’)

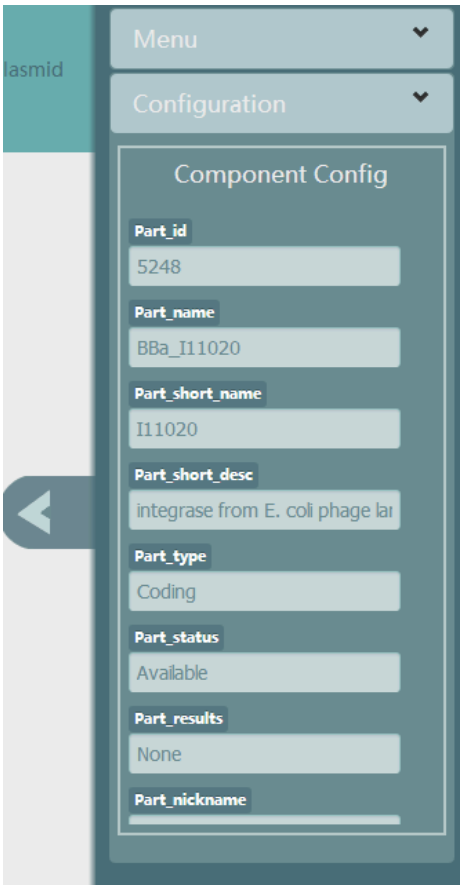


II.Work on your biobricks.

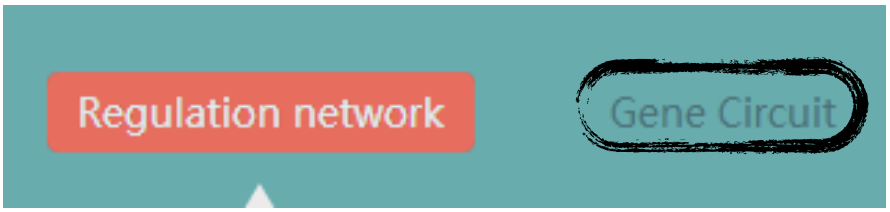
On the working panel, you are able to design regulation networks and manage them.
When clicking on one of the biobricks on the working panel,



configuration of this biobrick can be review on the Information Panel.(Right-hand side)



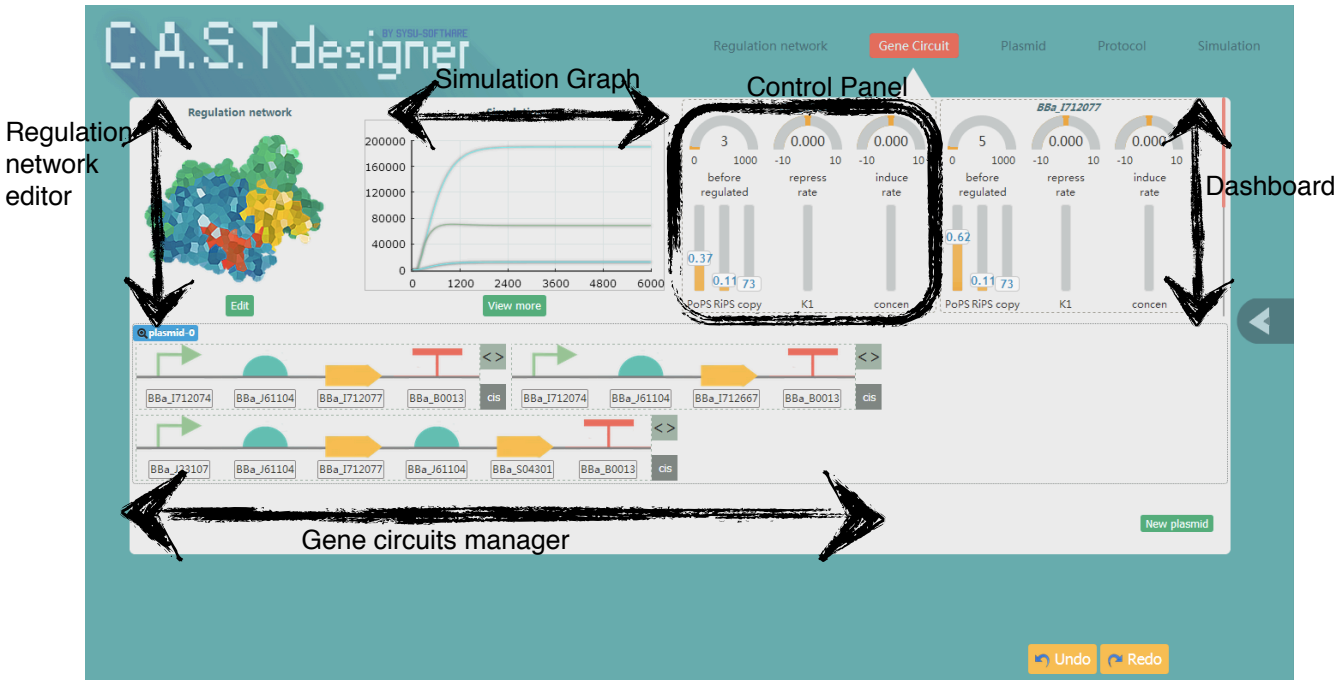
III. Generate gene circuit.
Click on ‘gene circuit’ after building regulation networks.



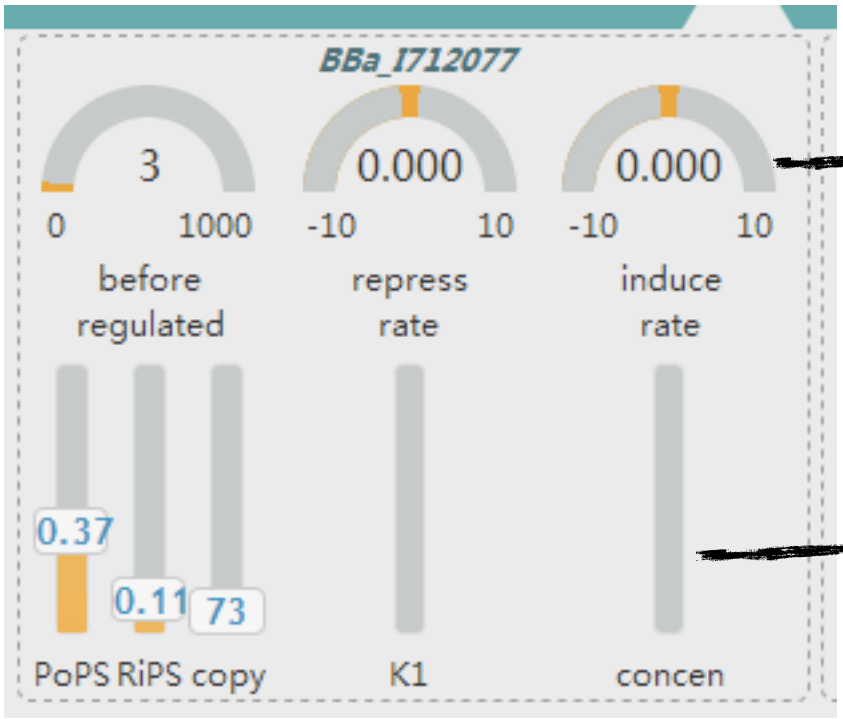
Instruction

‘Gene circuit’ interface at a glance.

1. **Dashboard**: On the dashboard, each biobrick in the regulation network has a control



panel, which allows users to adjust its configurations, such as PoPS, RiPS and so on. After setting, the rate calculated is showed on the upper panel.

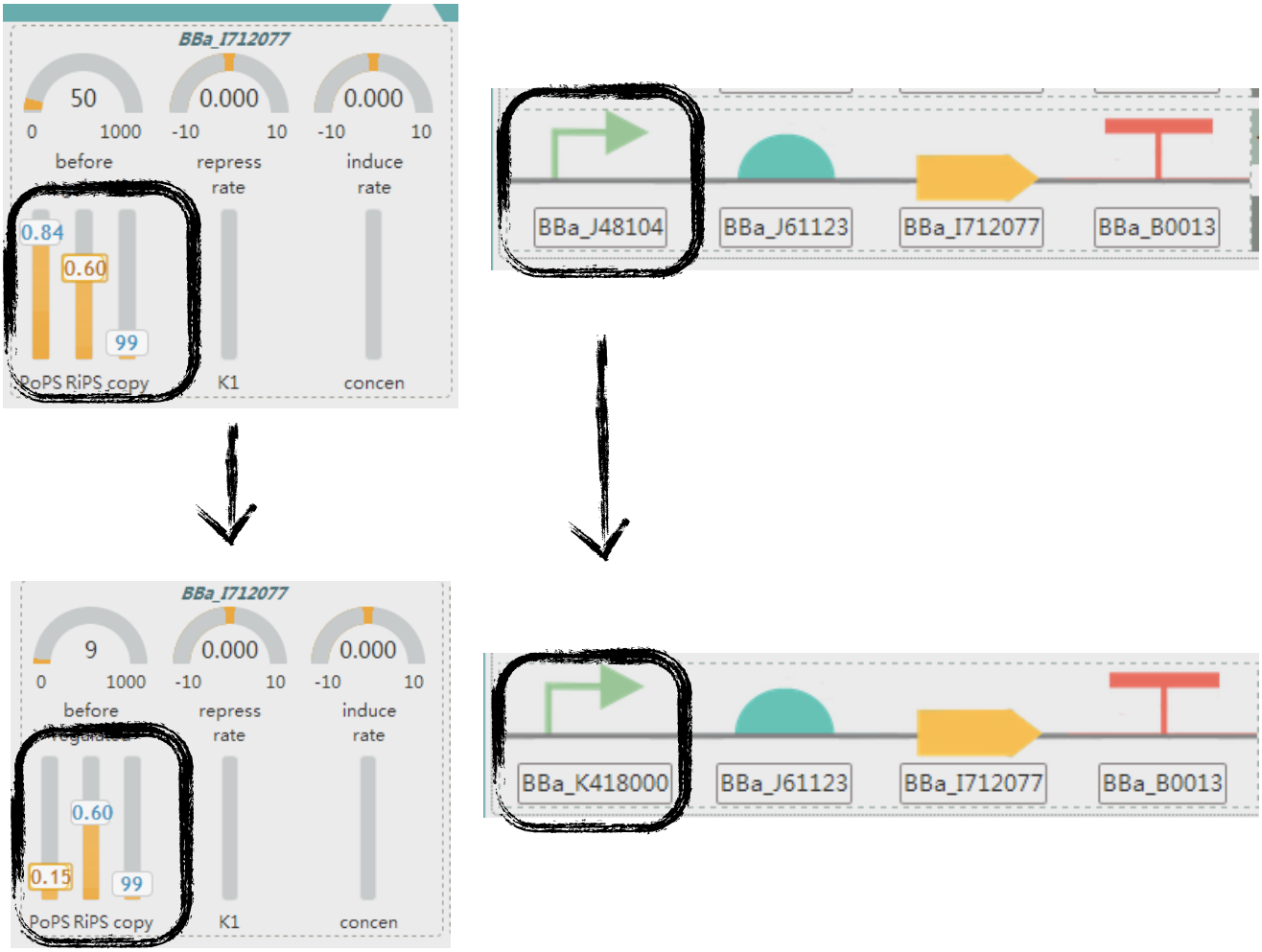


Efficiency

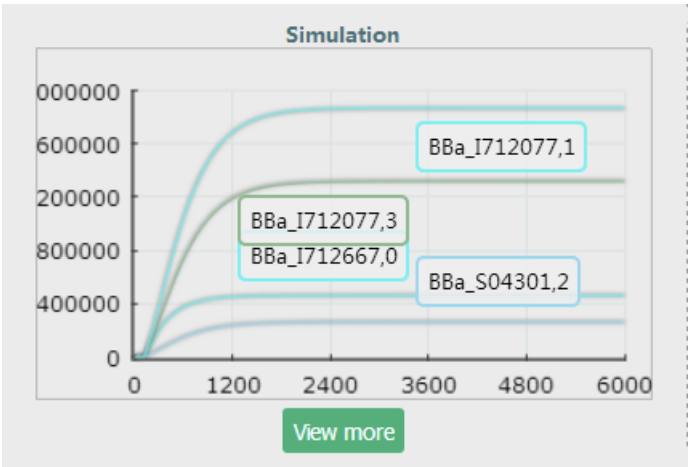
Parameters of the biobrick

When adjusting, CAST changes the specific

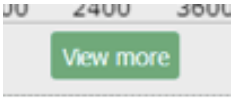
biobricks in the circuit(promoter, RBS, etc.) automatically, according to the value you set.

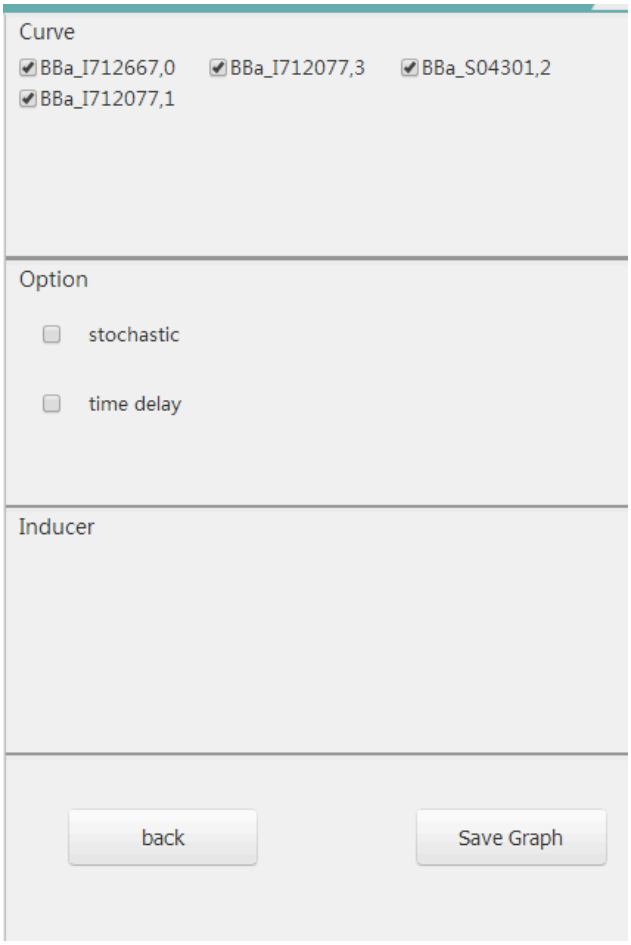


2. **Simulation graph**: According to the configuration, CAST calculates the expression efficiency of each biobrick and show it as curves.



If you need more information or more complex simulation, you can click to enter ‘Simulation’ interface.



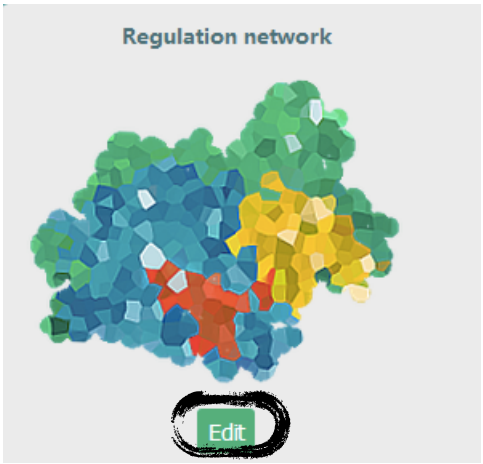


Choose the curve you want to view

Add conditions for intricate simulation

Save the graph or return to ‘Gene Circuit’ interface

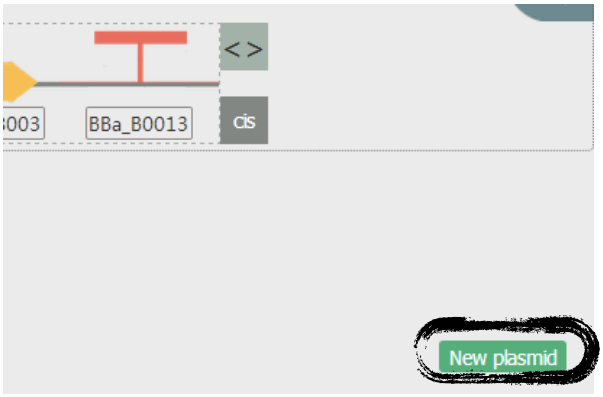
3. **Regulation network editor**: You can return to ‘Regulation Network’ interface for further edition.



Click and go back to ‘Regulation Network’

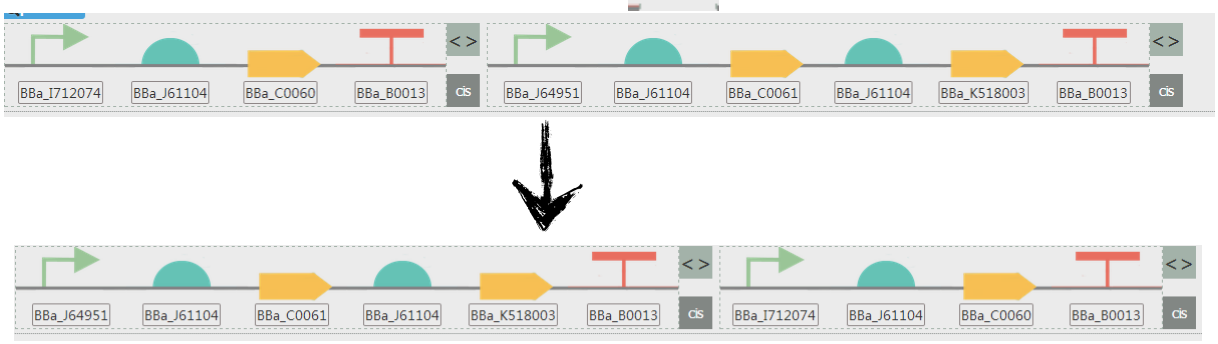
4. **Gene circuits manager**: The information of Gene circuits on the plasmid is displayed on this panel.

You can add one more plasmid if you want

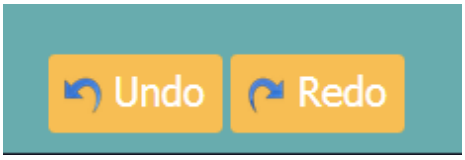


Add a new plasmid

You can simply move circuits by clicking 

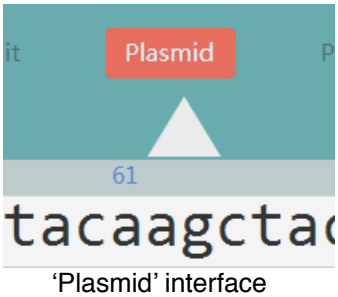


At last, if you think you have done something wrong, you can click



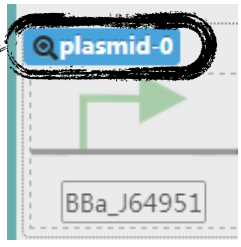
III. View the plasmid

To see check the plasmid, just click ‘Plasmid’ on the Function panel, or ‘plasmid’ button in the Gene circuit manager.

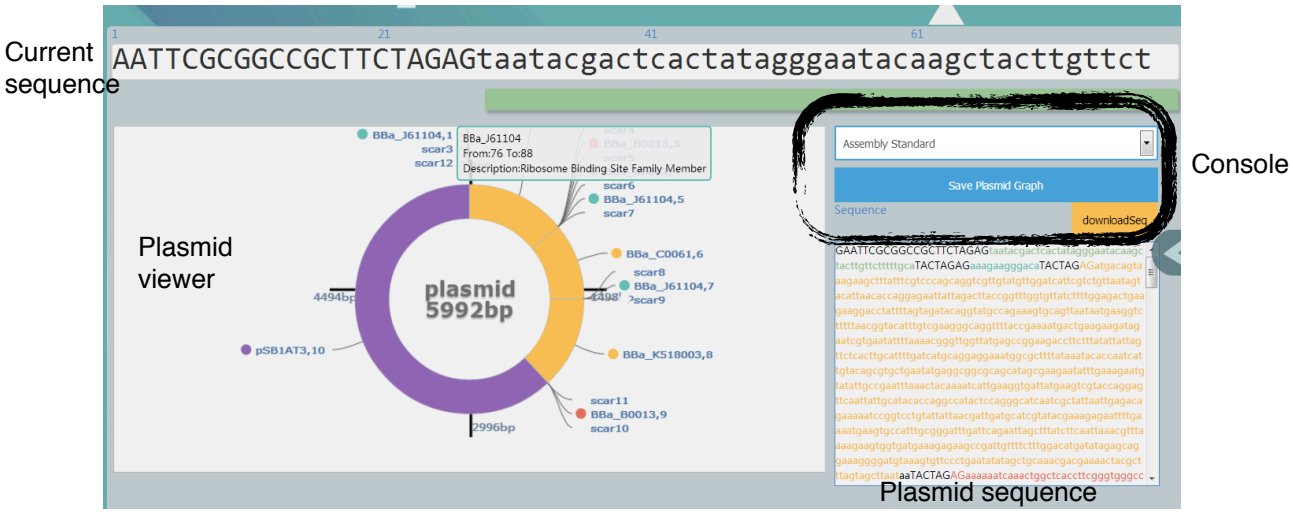


‘Plasmid’ interface

‘Plasmid’

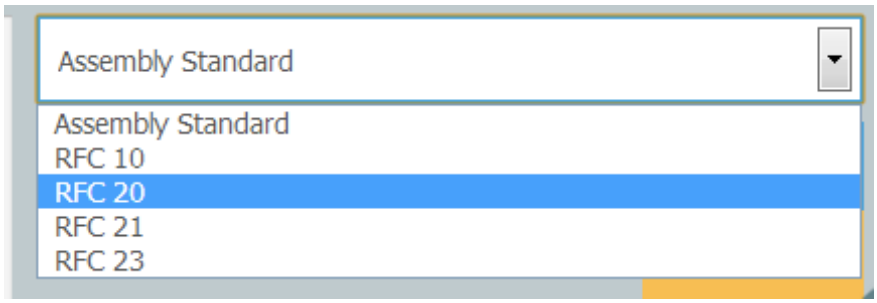


interface at the glance

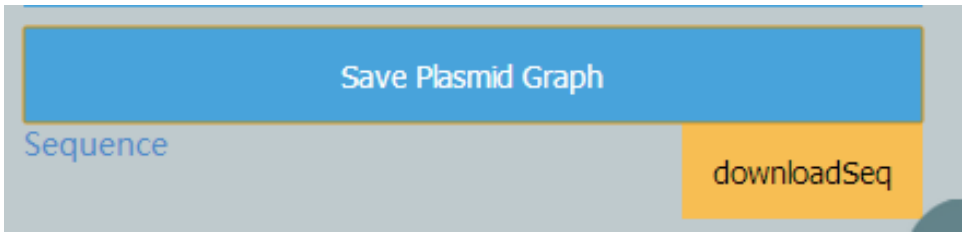


In the plasmid viewer, users can drag their mouses and rotate the plasmid, in order to check each part of it. In the meanwhile, the sequence of the part your are viewing is displayed on the upper side. You can also see the whole sequence of this plasmid.

On the console, you can choose different types of plasmid

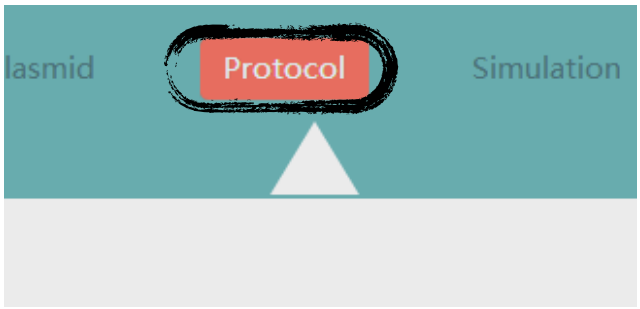


You can download the sequence or save the plasmid graph if you like.

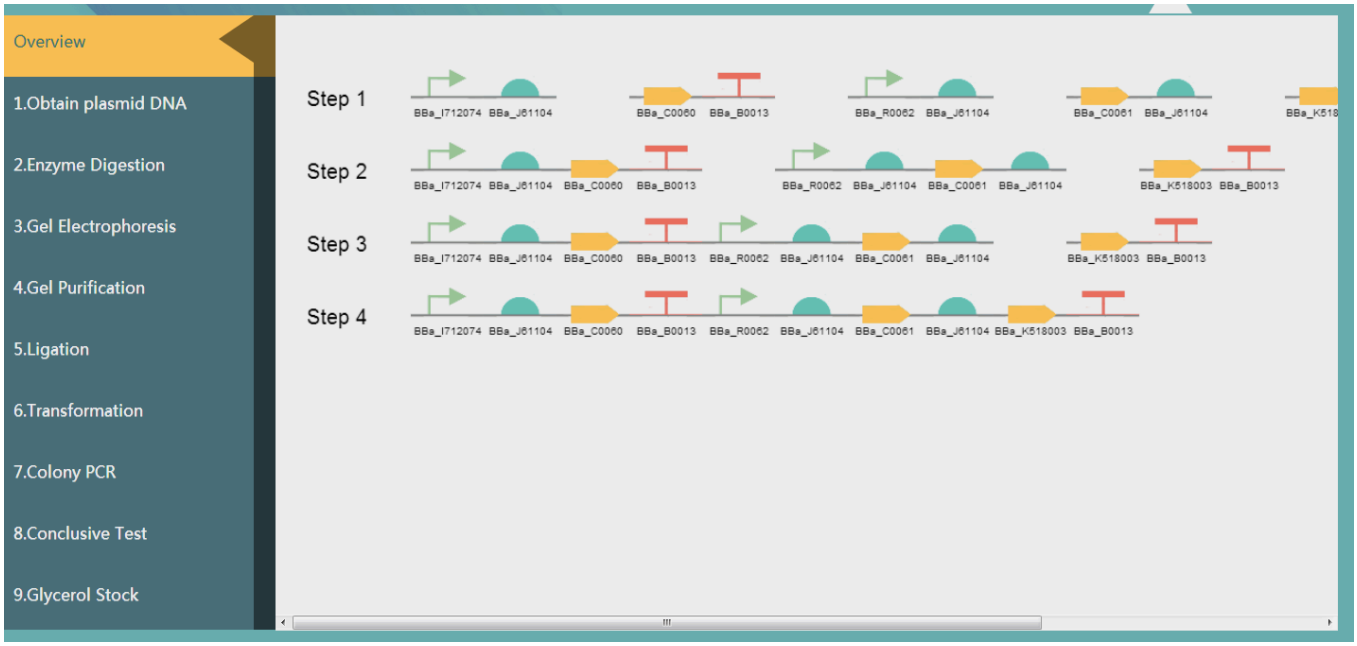


IV. **Design the experiments**

1. Click ‘Protocol’ button to enter next interface.



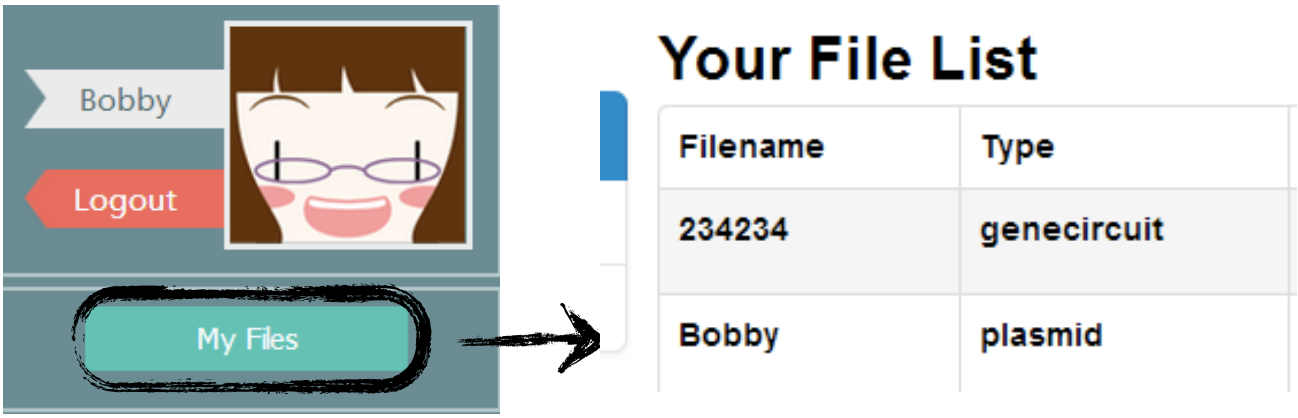
2. On ‘Protocol’ interface, you can find standard experiment methods that give you guidance in wetlab.



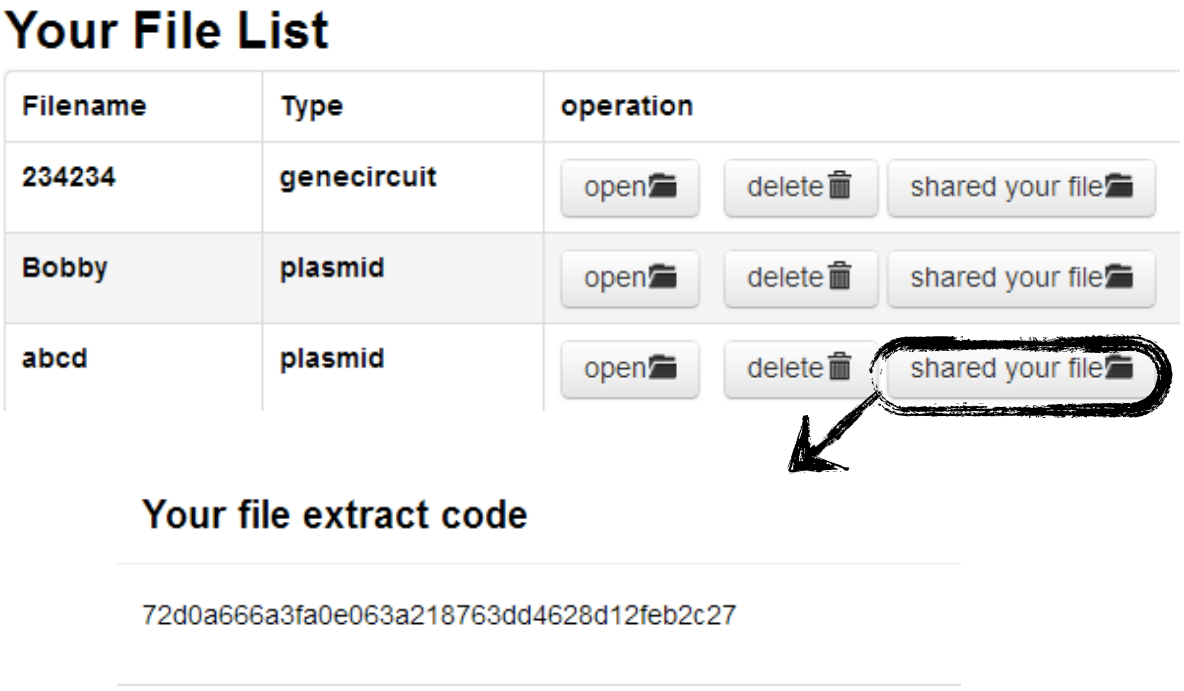
V. **Manage your files**

1. Return to ‘Gene circuit’ or ‘Plasmid’. Open information panel and click ‘Save’ after naming this file.

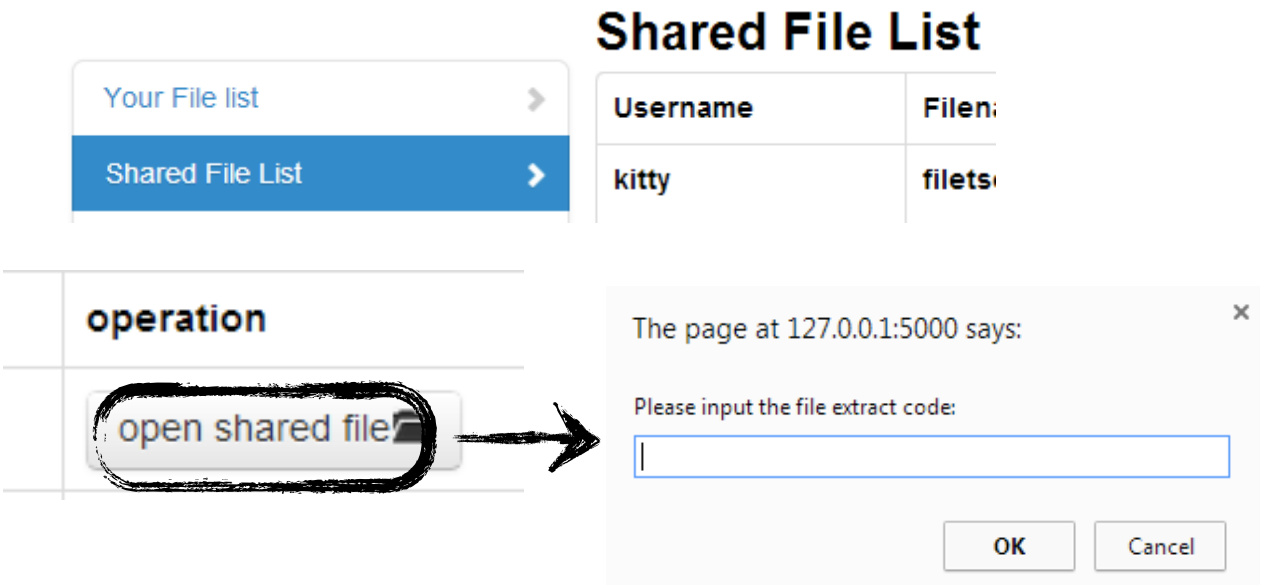
2. You can find your file by clicking on ‘My Files’.



3. You can manage your files. (Share, for example)

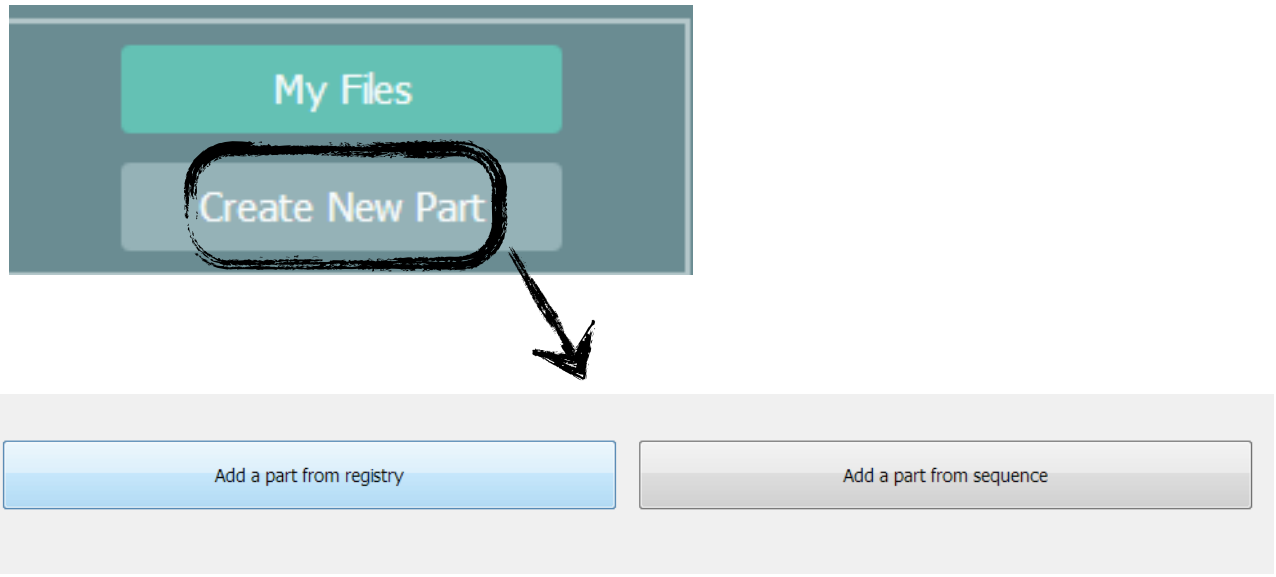


You can acquire others' shared files by inputing extract code. It's the same to others.

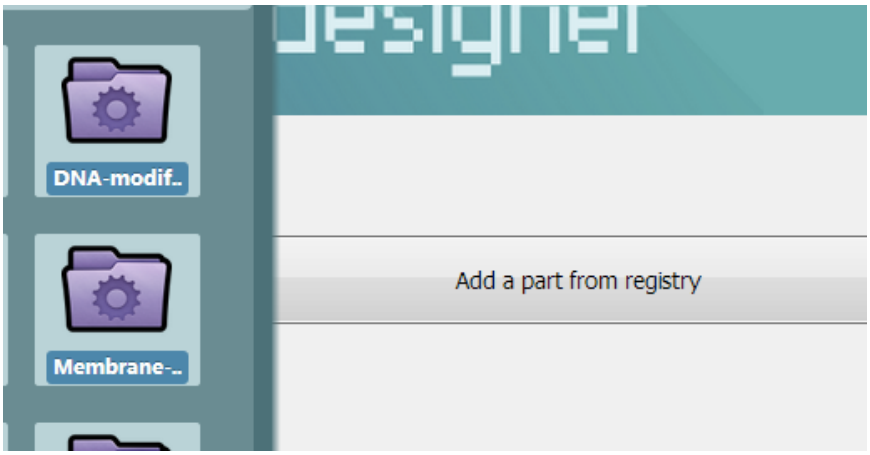


VI. Add your own biobricks

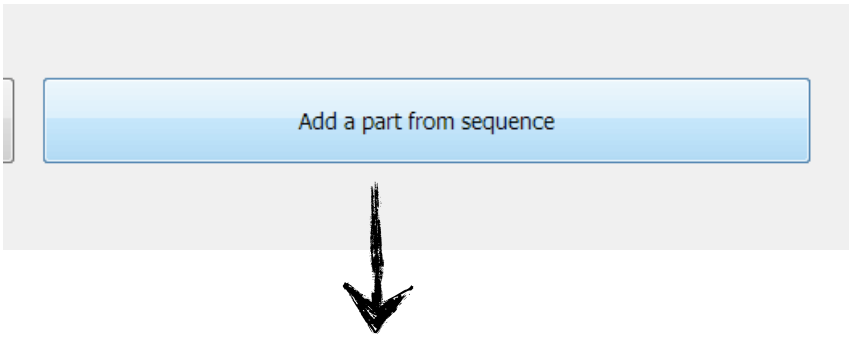
1. Open information panel on ‘Regulation Network’ interface. Click on ‘Create New Part’ to add your own biobricks.

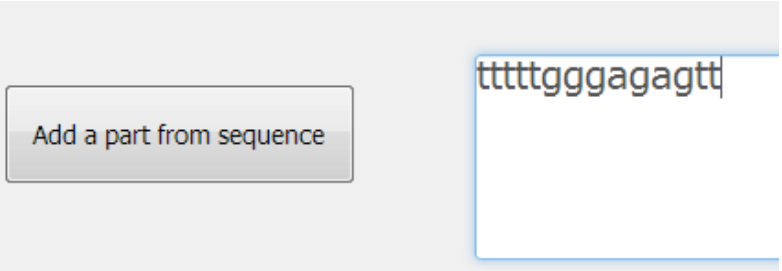


2. If you want to add a part based on registry, you can choose one biobrick from biobrick panel.

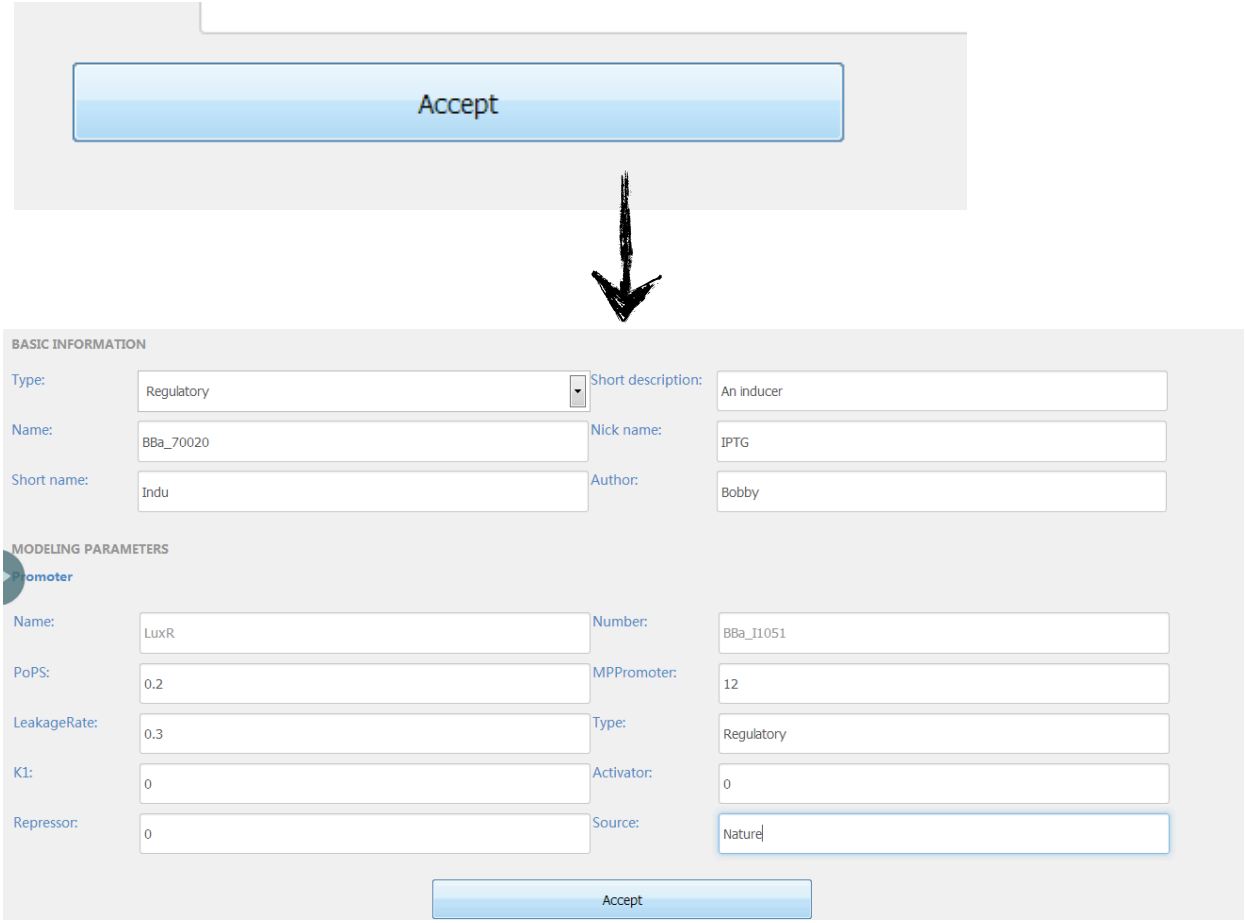


3. If you want to add a part from sequence, you can input the sequence in this blank.

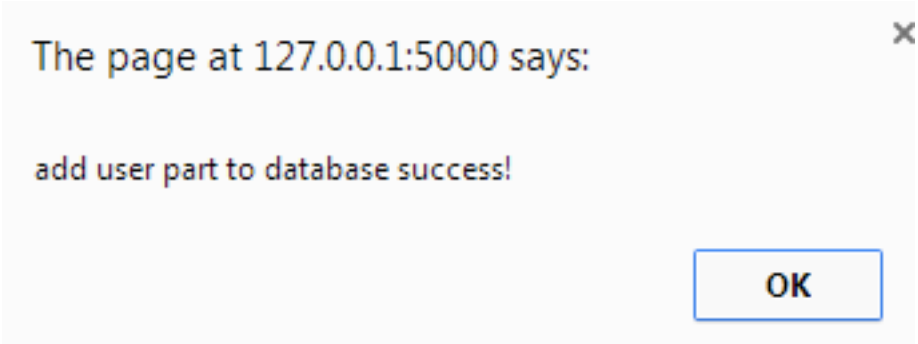




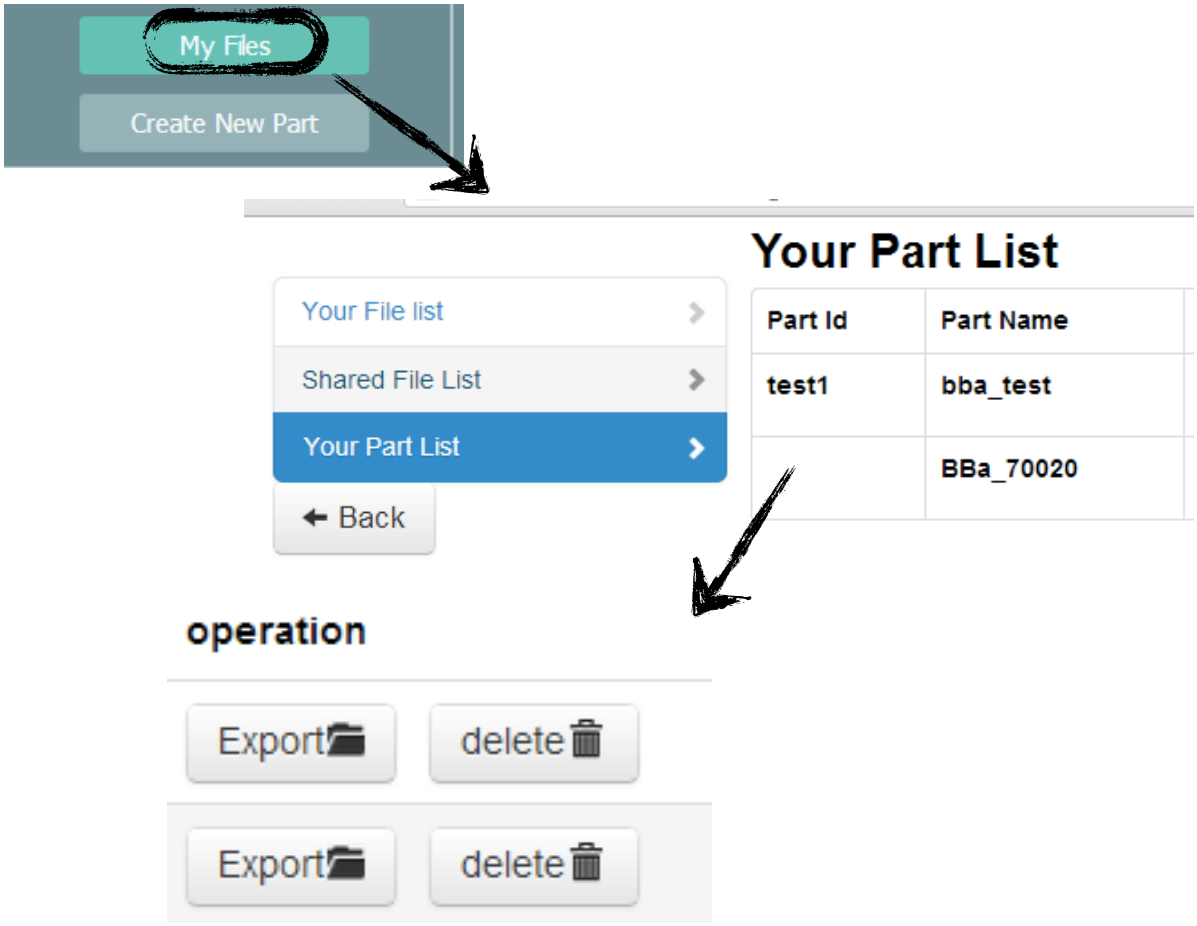
4. Click ‘Accept’ after finishing. Then provide the entire information of the new biobrick.



Click ‘Accept’ to finish.

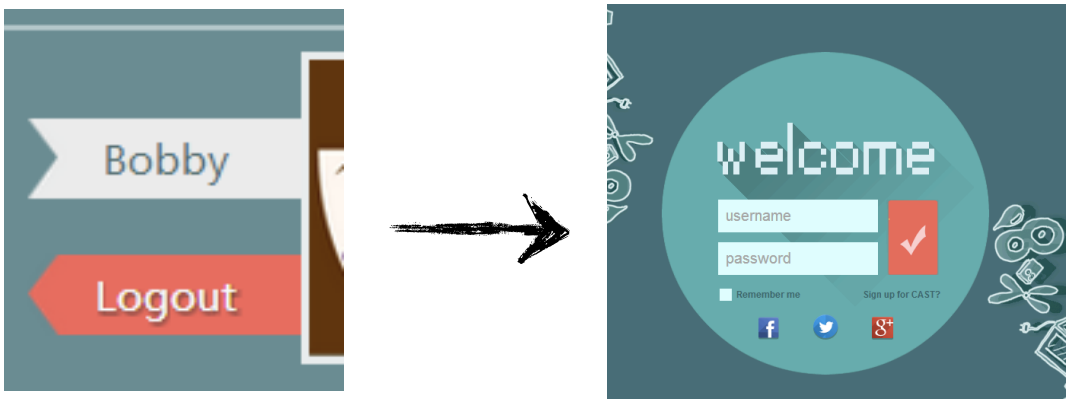


5. You can find you own parts enter ‘Your Part List’ from ‘My Files’ and manage them.



VII. Finish & Log out

When you finish all your work, just log out and exit for relaxation. You files will be saved well.
Click ‘Log out’, then close the window and exit CAST.



VIII. Other functions

1. Change your account information

Click your name or photo to enter your account profile, where you can change your information.