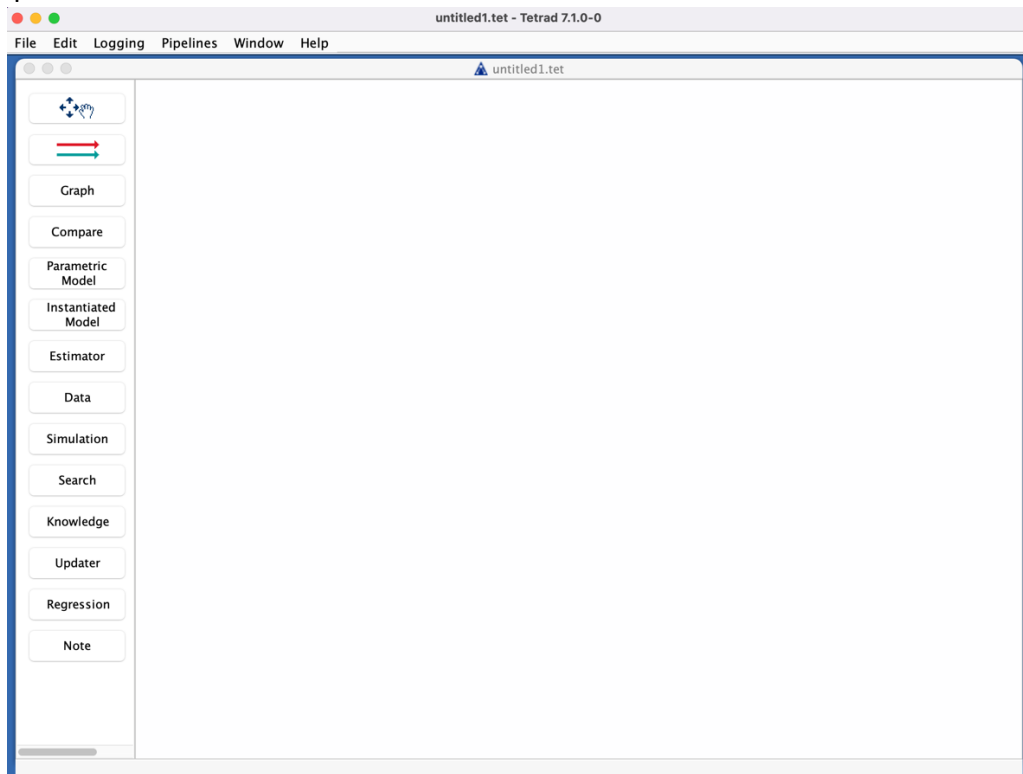
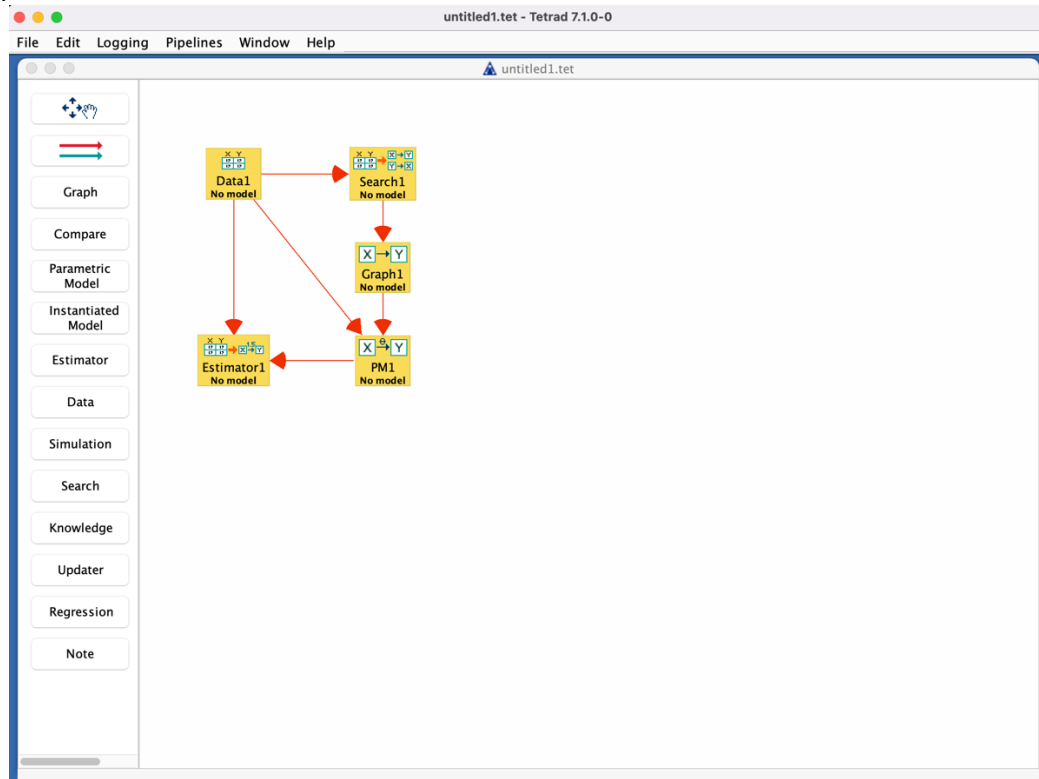


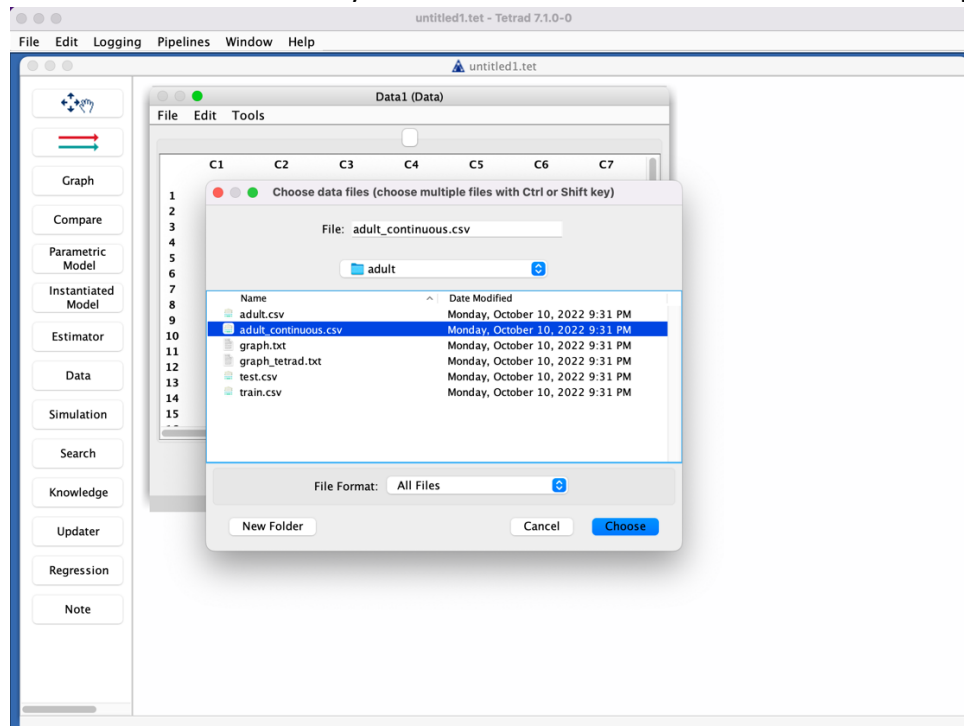
1. Open Tetrad:



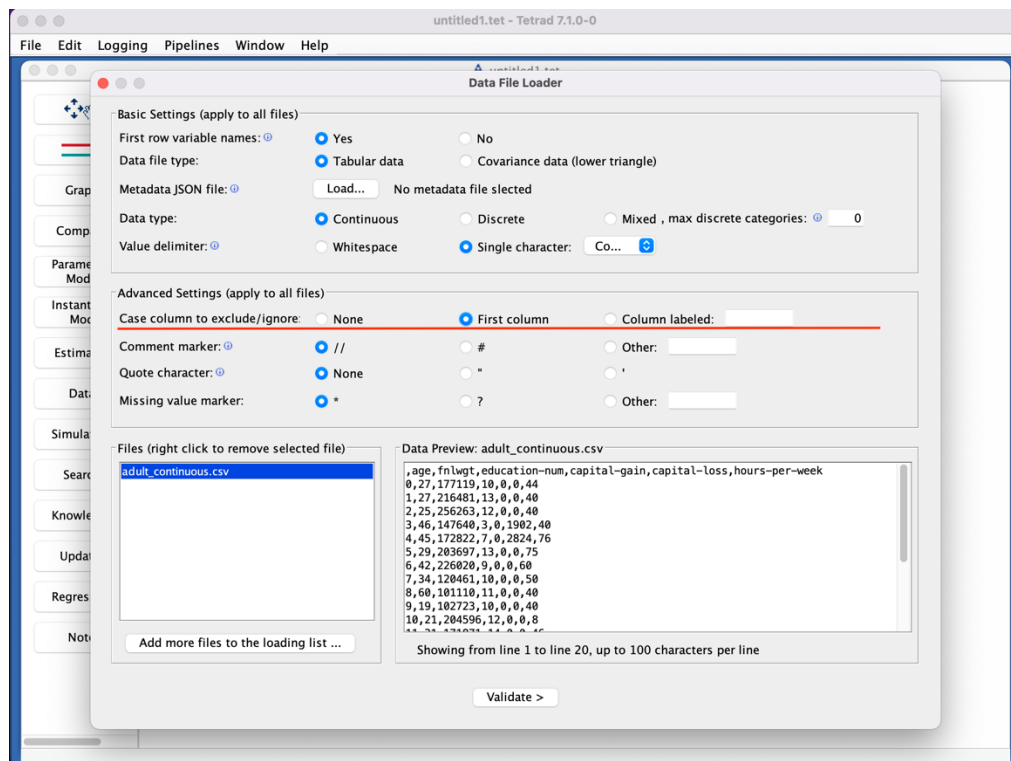
2. Pipelines -> Click 'Search then estimate':



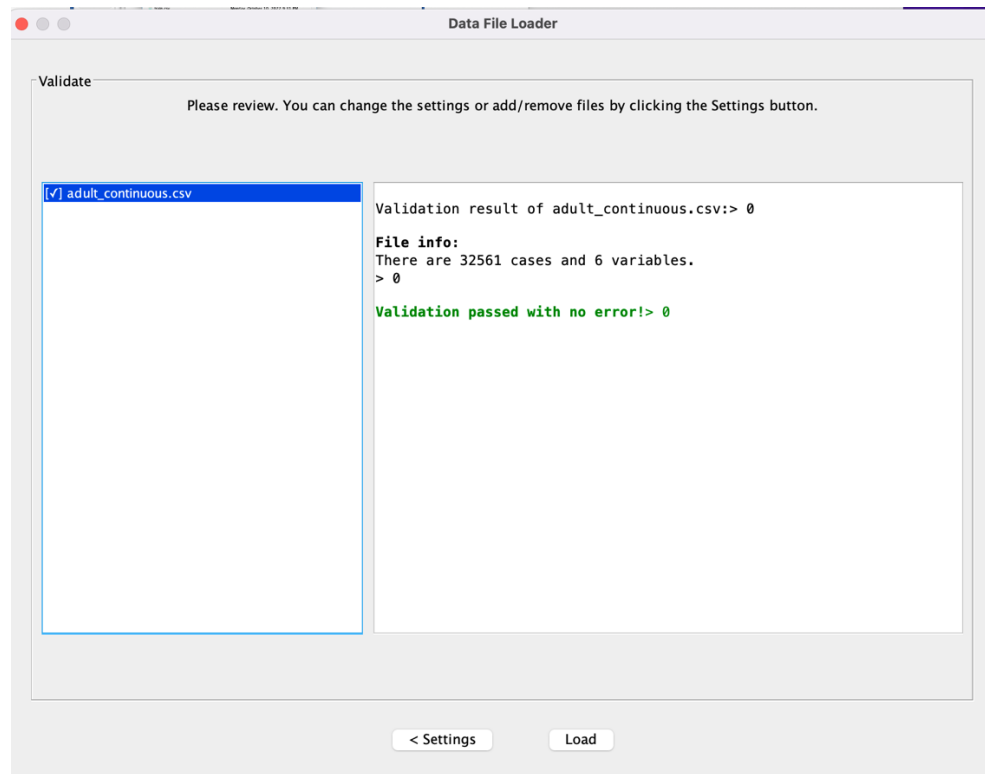
3. Click 'Data 1' block and load your dataset. We use Adult dataset as an example:



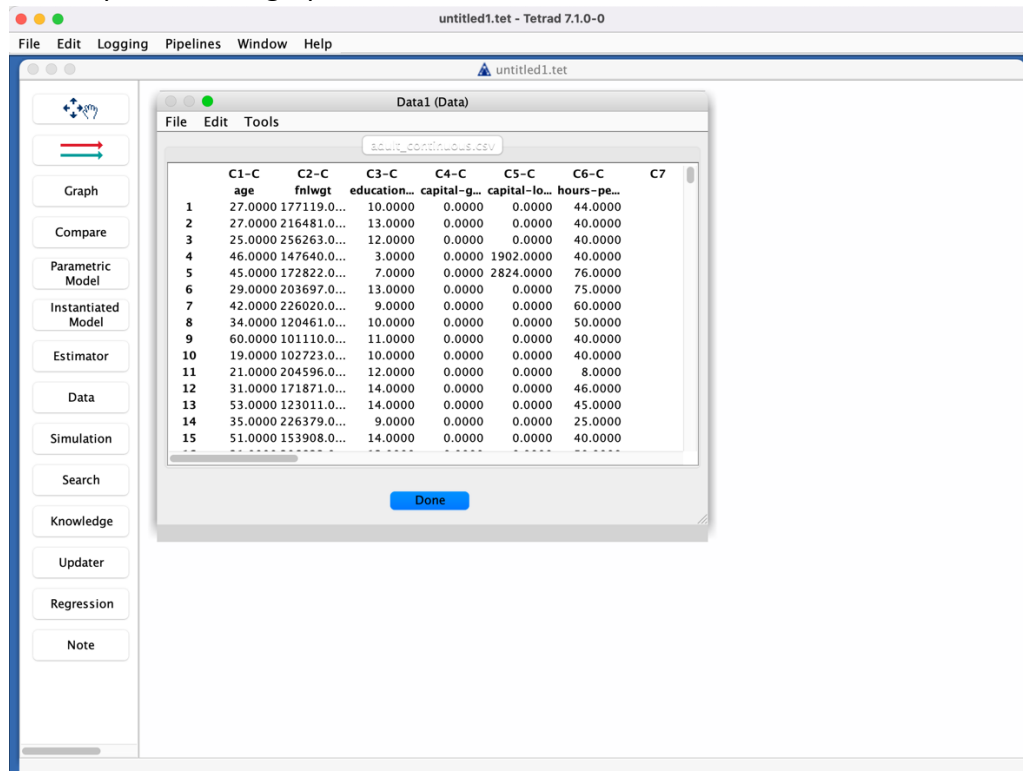
4. If your csv file includes index column, you can ignore the first column according to the following settings. Then, click 'Validate' button at the bottom.



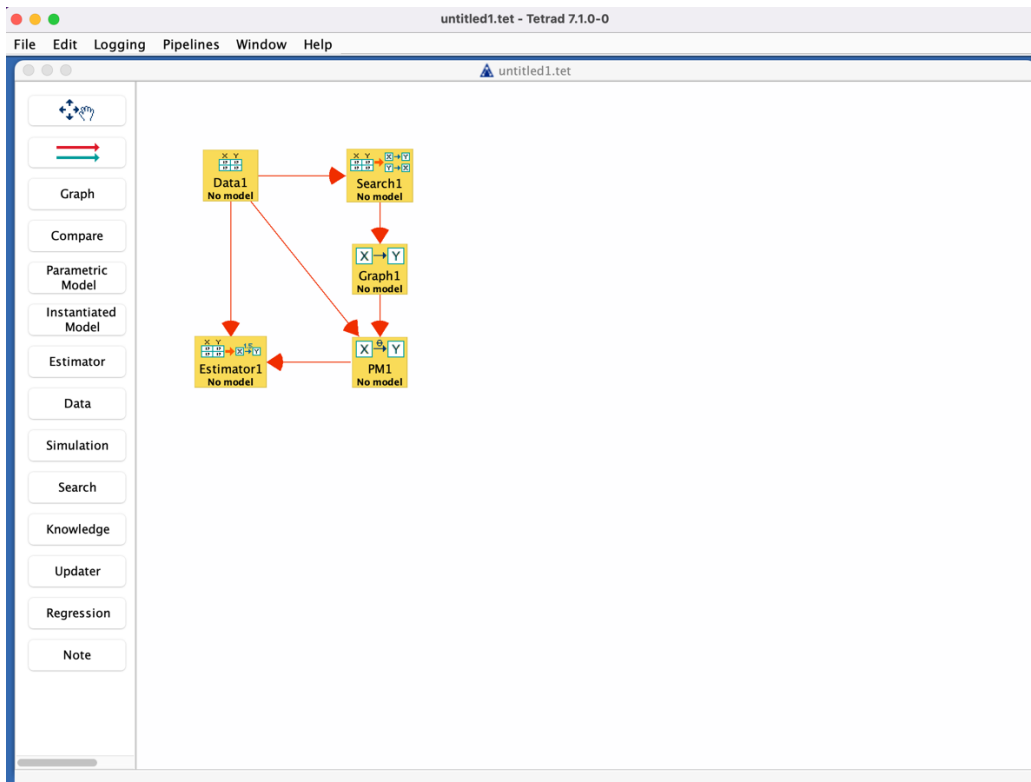
5. Click 'Load':



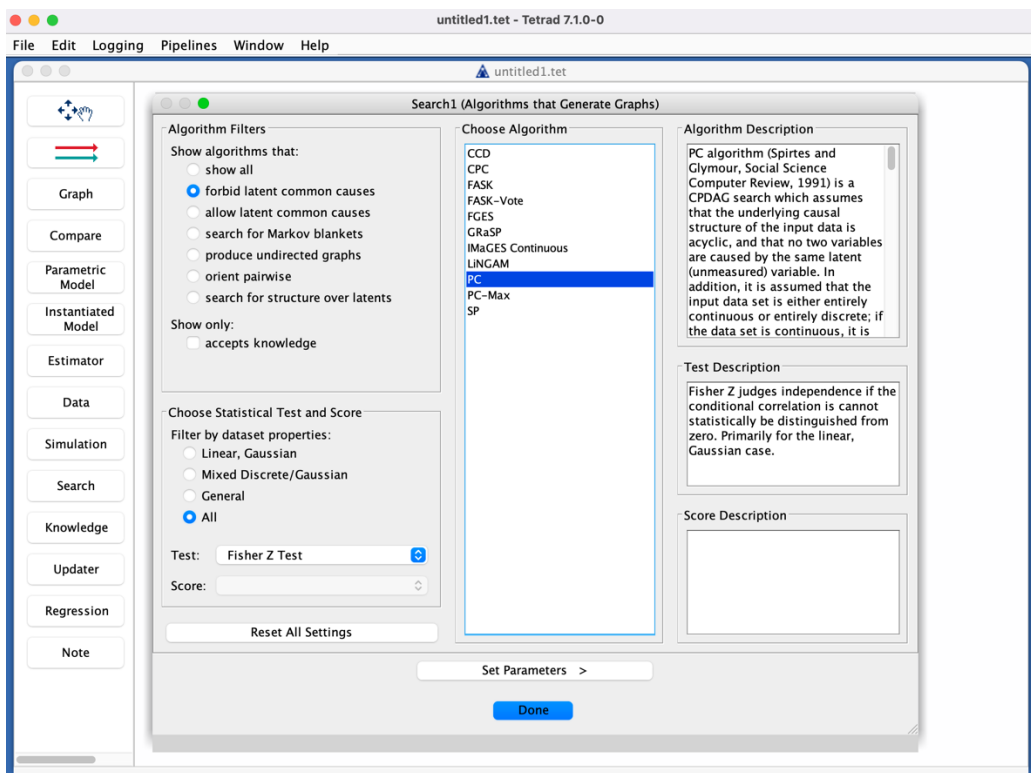
6. You will preview the graph and click 'done':



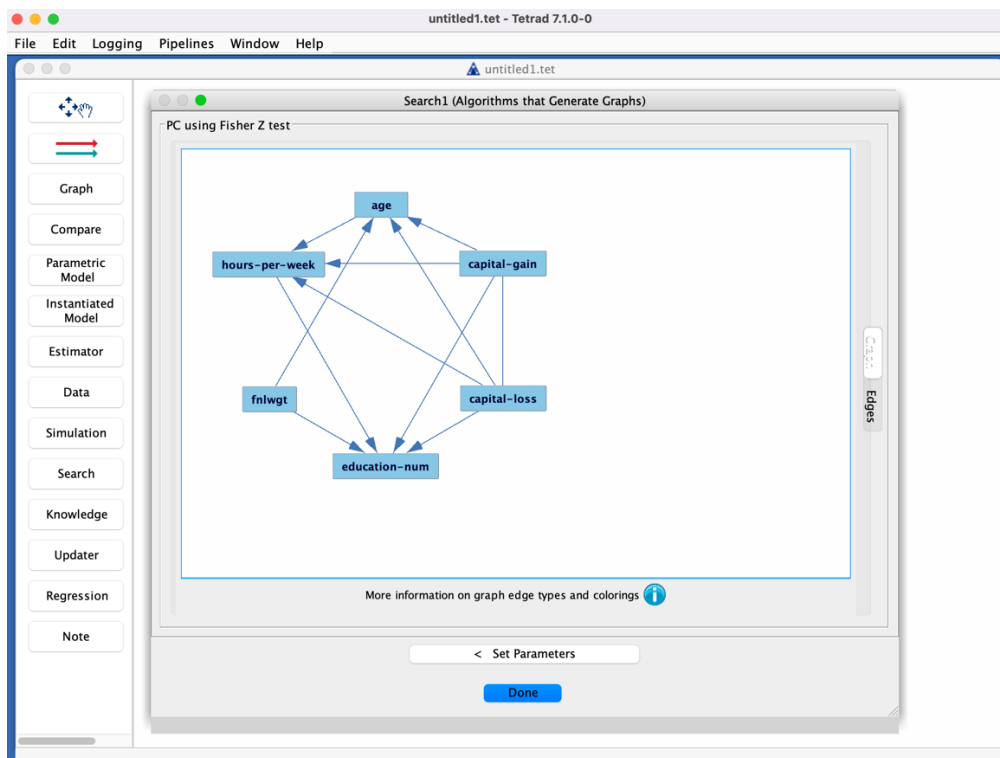
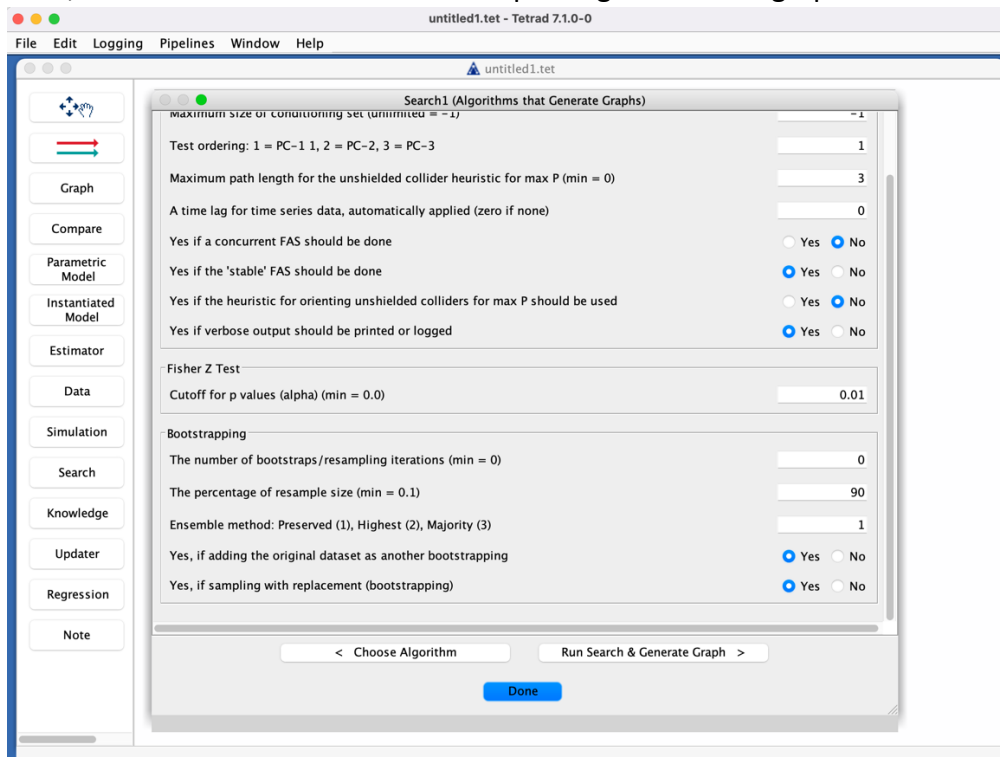
7. Click 'Search 1':



8. Then, choose 'PC' algorithms in 'forbid latent common causes' and then click 'Set Parameters' to check parameter.



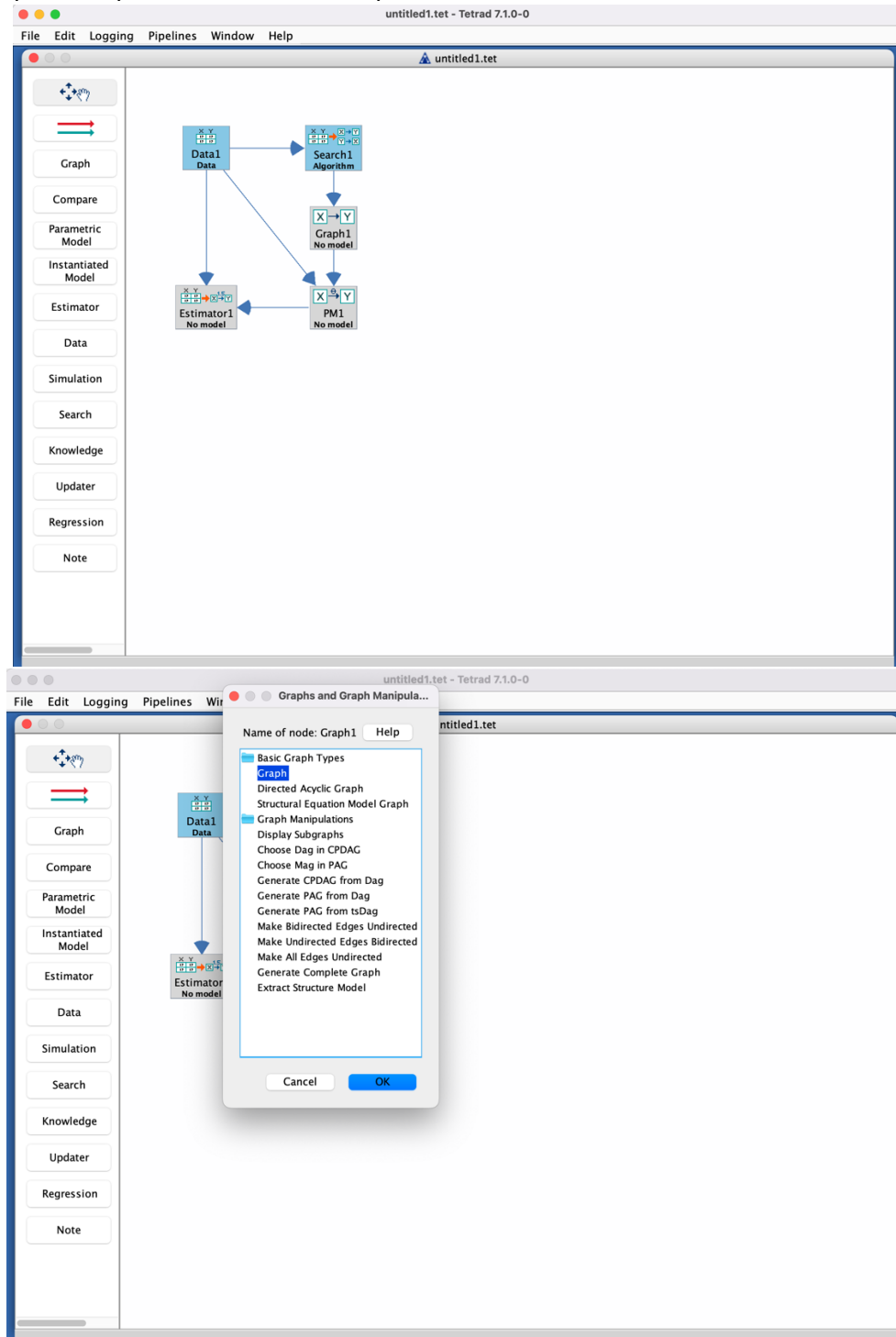
9. Next, click 'Run Search & Generate Graph' to generate the graph:



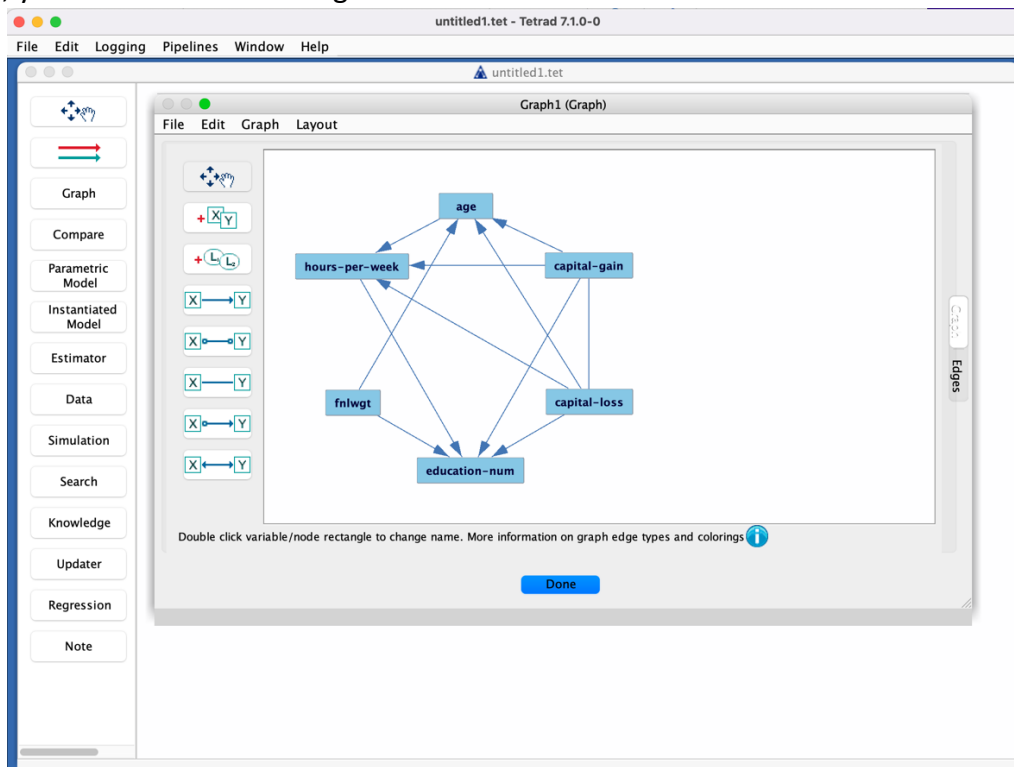
Click 'Done' to save graph.

10. **(Important but Optional!)** In PC algorithm, it may generate undirected edge. In this situation, you need manually add a direction for the undirected edge. In our example, there isn't direction between 'capital-gain' and 'capital-loss'. Therefore, we need add a direction between with that.

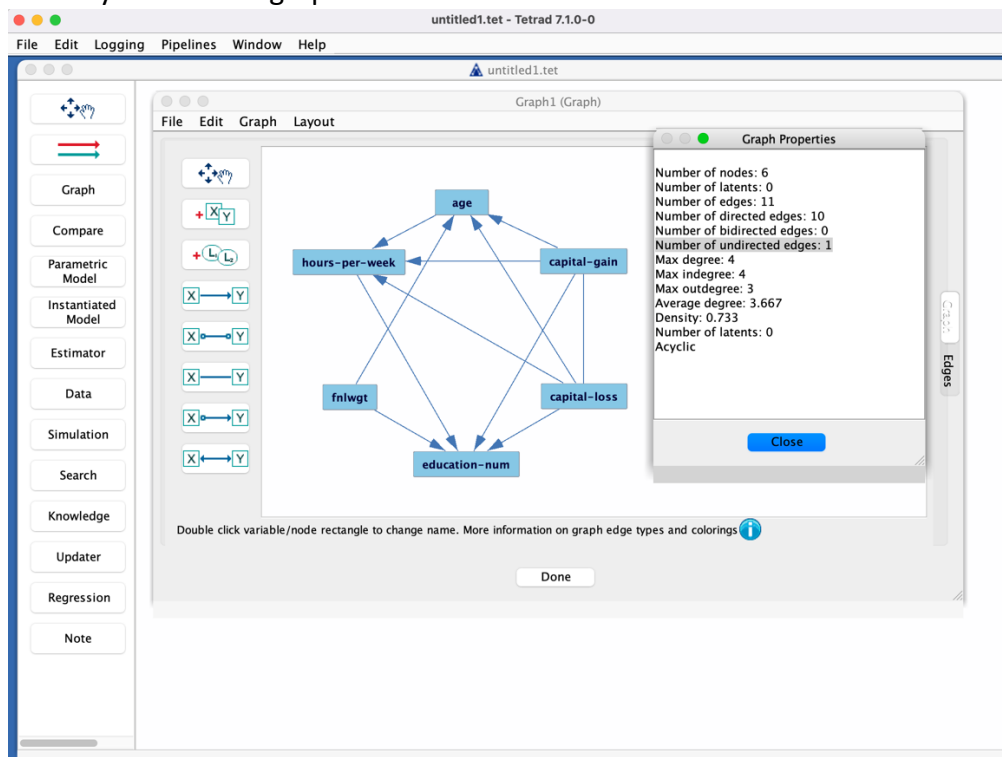
We open 'Graph 1' and choose 'Graph', then click 'OK'



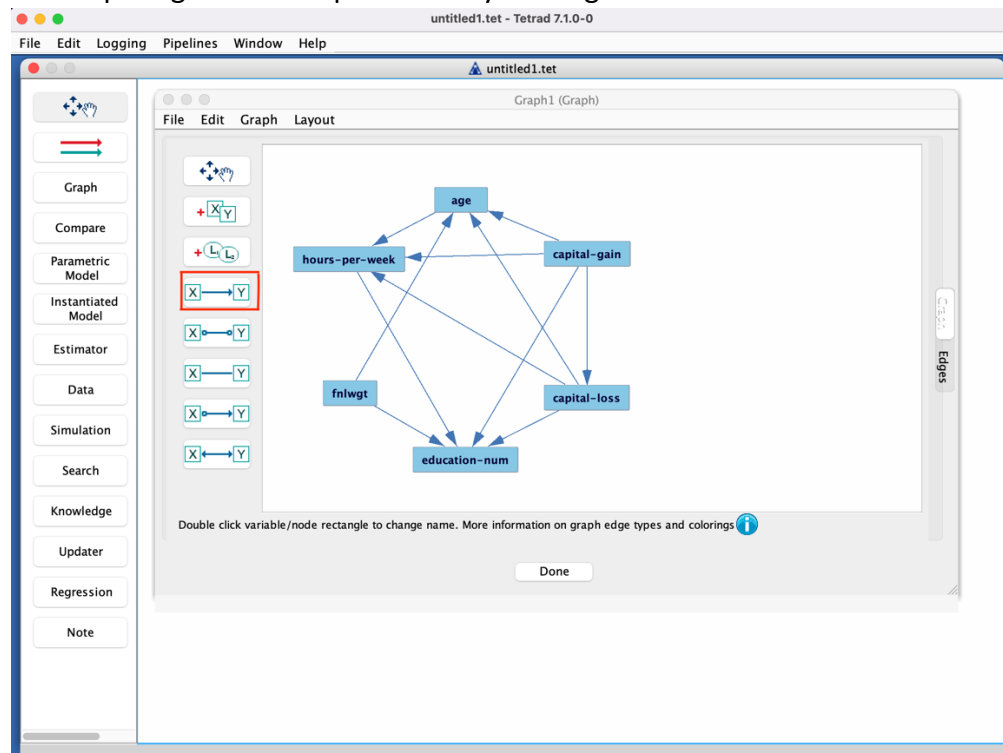
Then, you will see the following windows.



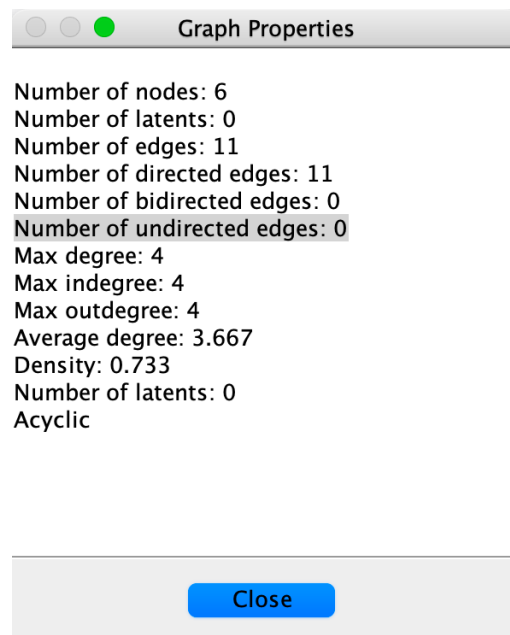
If you open Graph-> Graph Properties, you will see a sub-window where the window shows how many undirected graphs there are



Next, you can click undirected edge in graph and delete it. Then, you can add a new directed edge between 'capital-gain' and 'capital-loss' by clicking on the button we marked in the picture.

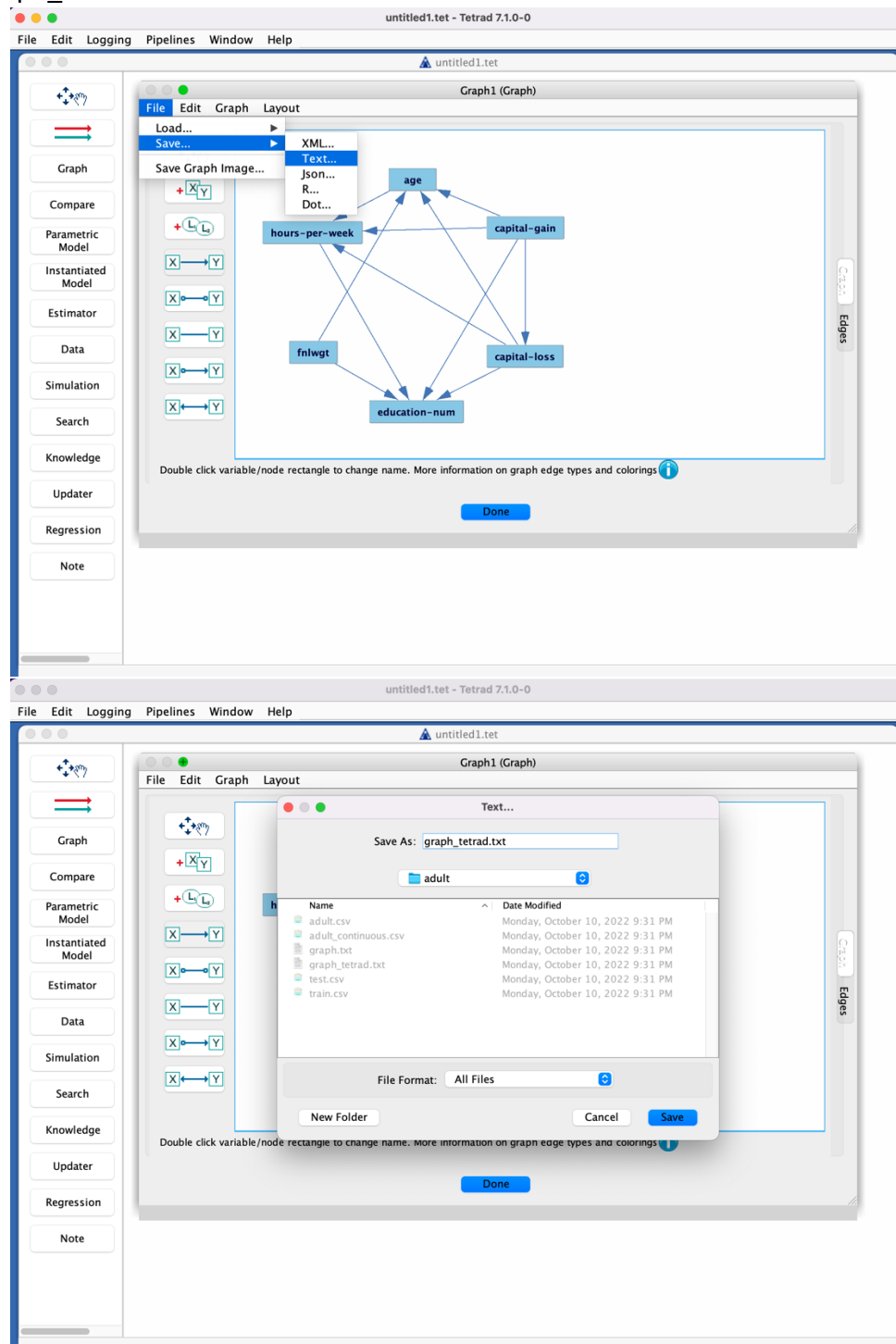


Now, you can check graph properties again. The result shows that there is not undirected edge in graph.



But make sure there are no closed circle in the graph after adding the new directed edges!!!

11. Save the generated graph as a txt file. In generally, we named the file as 'graph_tetrad.txt'.



The above is the whole process of using Tetrad to generate causal graph. After that, we will convert 'graph_tetrad.txt' to the common graph data type. We will explain the following steps in Github Repo.