# Computer Essentials for Engineers

GNG1103 – Engineering Design

Part C – Planning (*Trello* with the *BigPicture* power-up)

If you have not done so already, please watch the 3-minute "Basic Planning" introductory video from Brightspace, located in the Lab 1 folder. For this lab, we will be using a basic work planning tool called *Trello* (https://trello.com/en). *Trello* is a planning tool that supports the basic features that we need for the planning and tracking of all of the tasks for our project (implemented as a "board" in Trello). As outlined in the video, these are:

- Task creation (tasks are implemented as 'cards' in *Trello*)
- Task ownership (using the 'members' field of a card)
- Task duration (using the 'due date' field of a card)
- Task dependencies (using the dependency links in the *BigPicture* power-up).

Task Name
(Task owner)
(Task duration)
(Required resources)
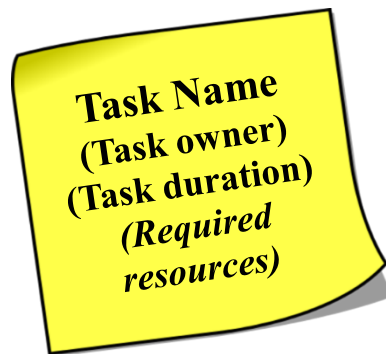
Trello is a lightweight tool that works well for managing tasks to their completion. In this lab, a basic *Things to Do / Doing / Done /* categorization approach is proposed, which is the default. *Trello* supports this using 'cards' (for tasks) placed on a 'board' (for the specific project). A good overview of the *Trello* tool can be found at:
https://www.youtube.com/watch?v=xky48zyL9iA and this 5-minute video might be worth watching now.

Not all tasks have the same priority or urgency. In his famous book: "7 Habits of Highly Effective People", Steven Covey created a simple matrix of task categories. He defined four quadrants, based on task importance versus task urgency. The basic idea is that tasks should be done by order of their quadrant.

We tend to do items in quadrant 1, without too much prompting, and we tend to do them first (e.g. when a house is on fire!). However, we often waste time doing quadrant 3 and quadrant 4 tasks, when we should be doing quadrant 2 activities. This lab uses the Trello tool that will help you with the quadrant 1 and quadrant 2 tasks for your projects. Note that quadrant 3 tasks might *still* need to be completed, but not at the expense of tasks in the previous two quadrants.

An element missing in *Trello* might be an easy way to visualize time (which is what 'urgency' is all about, after all!). We tend to prefer pictures to text, so it would be nice if we could "see" our whole project as a picture in time. The classic way to do this is using a Gantt chart (https://en.wikipedia.org/wiki/Gantt_chart), which shows tasks as individual line entries and uses a conventional view of time, going from left to right on the page. Fortunately, there are several add-on "power-up" tools that can used with *Trello* for this and we will use one called *BigPicture* (https://trello.com/power-ups/5b30f2417825075d3e126cbb/bigpicture . An overview of this power-up is: https://www.youtube.com/watch?v=M0f5Sx5SeKU). With the free version of *Trello*, you can only have **one** "power-up" tool.

A Gantt chart is probably easier to manage using a more powerful tool like *Microsoft Project* (https://products.office.com/en-ca/project/project-and-portfolio-management-software). You are welcome to use *MS Project*, and we have used it in this class before, but the tool is probably better suited to cases when there are more people that need to be organized and/or the project has longer timescales. However, the previous version of this lab, based on *MS Project,* is still visible in the Labs 'References' folder, if you want to use it for your Gantt chart capture.
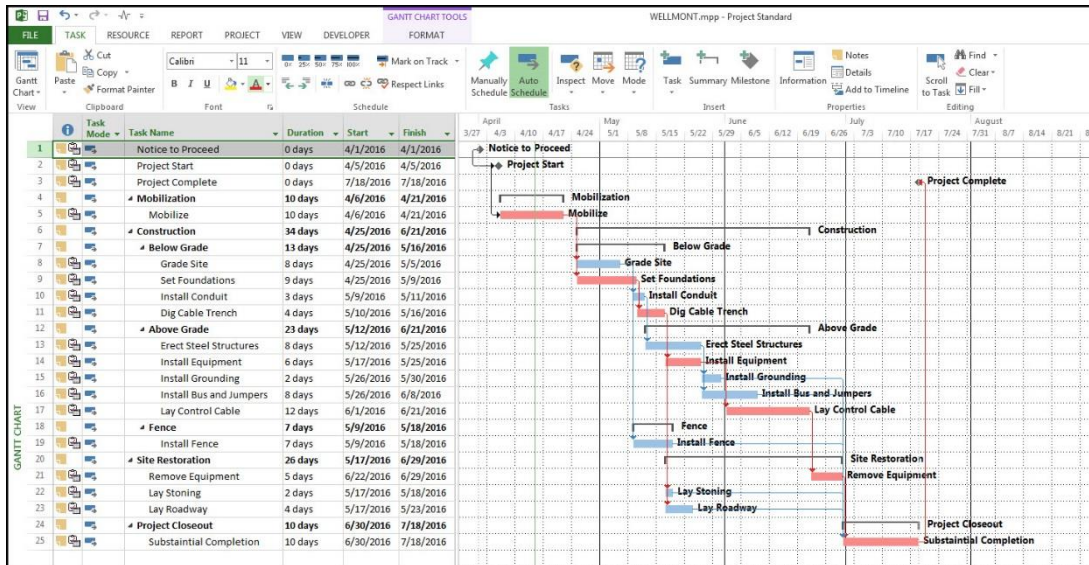
Image from: https://tensix.com/2016/06/displaying-two-gantt-chart-baselines-in-microsoft-project/

You are planning the tasks for your project in this lab. At this point in the course, you don't know much about the project or how you are going to do it. In fact, you don't even know who is on your team yet! In spite of this, you can still plan some tasks, although they will be generic ones for now and you will have to use labels like 'person 1' and 'person 2' until you know some real names.

As explained in the introductory video, the first thing that you need to do is determine what all of the tasks will be. You also need to guess at some of the durations for those tasks and think about some of the possible dependencies for each task. The milestones (tasks with zero duration and only a date) for all deliverables have already been defined for you in the course syllabus. We can use these milestones and then try to 'work backwards' from them, as it were, by defining the tasks required for each. You will need to verify the specific dates from the course syllabus, but the deliverables are:

A. Team formation and contract: Sep. 8
B. Needs Identification: Sep. 22
C. Design Criteria: Sep. 29
D. Conceptual Design: Oct. 6
E. Project Schedule and Cost: Oct. 13
F. Prototype I and Customer Feedback: Oct. 27
G. Prototype II and Customer Feedback: Nov. 3
H. Prototype III and Customer Feedback: Nov. 10
I. Design Day: Nov. 28
J. Final Project Presentations: Nov. 23 – Dec. 3 (varies with group)

Install Trello

1. Install the free version of the Trello tool by "signing up". After you press the "Sign Up – It's Free!" button, you will be asked for an email address, user ID and password.
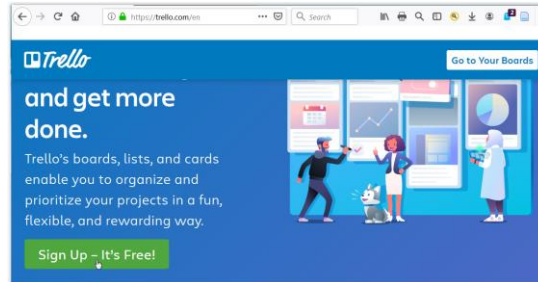
2. After that, you should see the following splash message. Click on "Get Started":
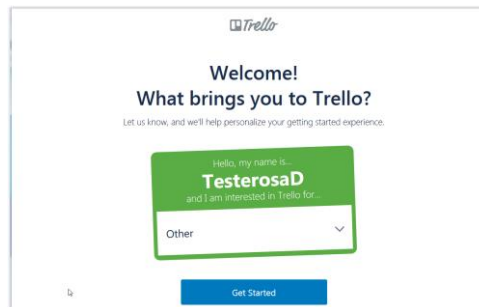

Create a Trello project ("board")

3. Create a work board called "GNG1103 Project"

4. Click on the blue arrow and accept the default settings for the list titles of: *Things to Do*, *Doing* and *Done*. You can add new lists later, if you want.

Capture tasks ("cards")

5. Click on the blue arrow again and then start to create your first tasks in the "Things To Do" list, which are entered as *Trello* "cards". Don't worry that you don't have all of the tasks defined yet. You will be able to add more tasks later. You can use the cards defined below for now.
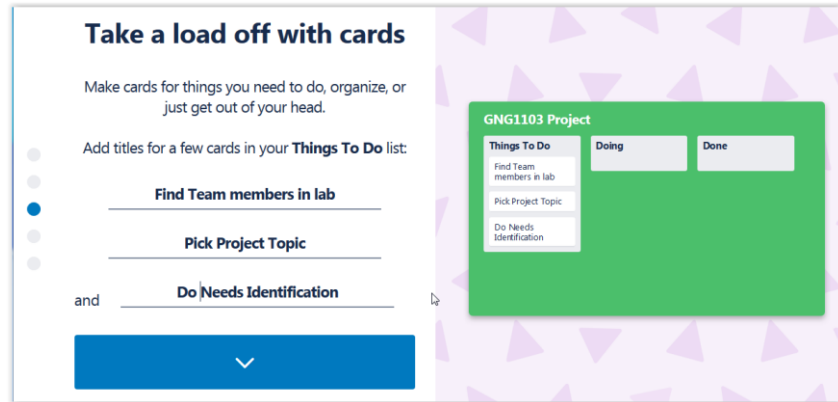
6. Enter a checklist item for the first task (i.e. for the "*Find Team members in lab*" task). These are the subtasks that will indicate how you are progressing with overall task completion. For now, we will add "*Talk to people in lab*", since your team-mates must be chosen from people in your lab section. Click on the blue arrow to capture your first checklist item.
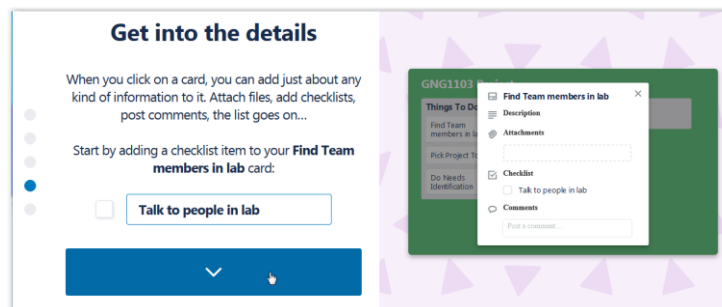

7. Click on the blue button : "*Now you're a pro. Keep building your board*" and you should get something like the screenshot below.
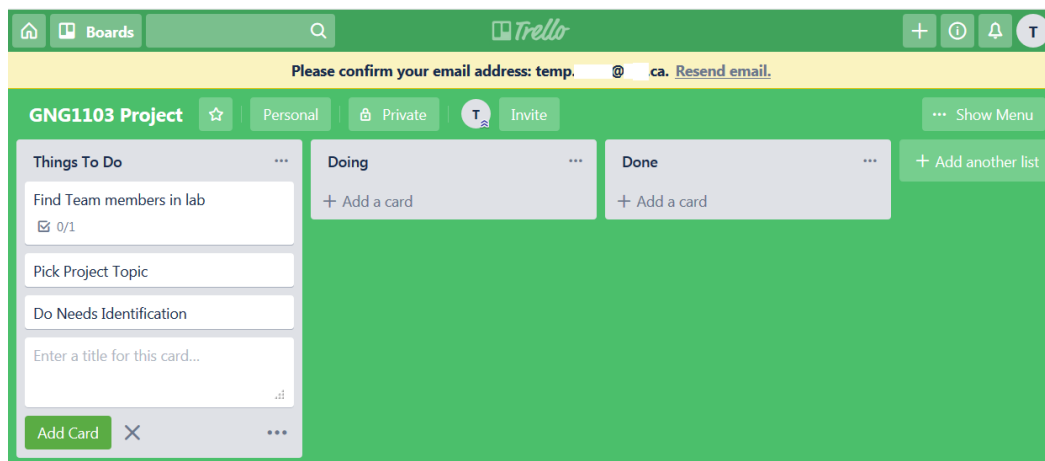
Edit tasks

8. Click on the first task card in the "Things To Do" list and you should see your newly-created checklist item ("Talk to people in lab") and you should get a pop-up menu like the one below, showing you other things that you can add to your task information.
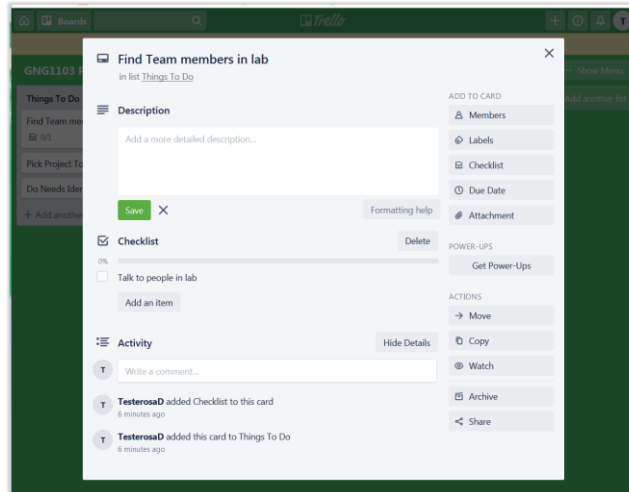

9. Add a short description like "*Find 4 other team-mates in my lab section for the project. Think about finding people with different skillsets. Diversity is a good thing, to avoid everyone all thinking the same way. Don't be afraid of working with new people (i.e. don't just choose just existing friends)!*". Add a due date, typing in the date of your next lab period.

**Trello Power-Ups and Installing BigPicture**

10. **Don't** "Enable the Calendar Power-Up" since we are only allowed to have *one* of these with the free version of Trello and we want to use *BigPicture* for our Gantt charts. In fact, let's install that power-up right now. Select the "Get Power-Ups" button.
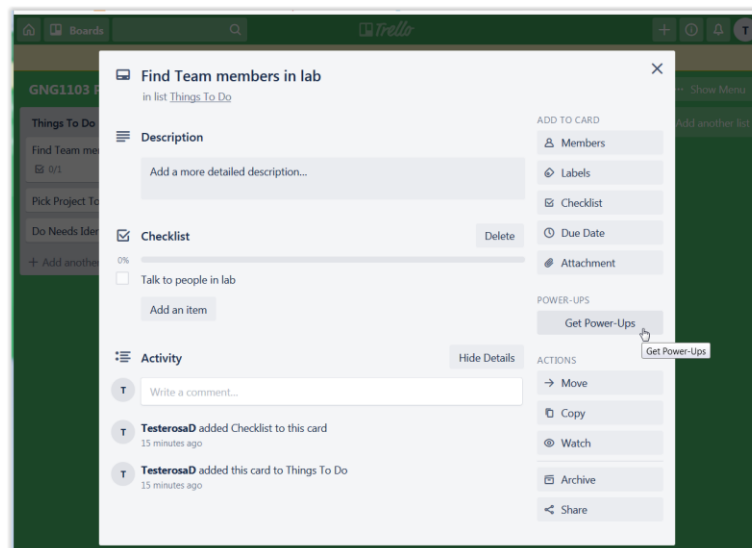
11. Next type in 'gantt chart' into the search box and then select "Add" for the *BigPicture* power-up and then 'Add' again, when prompted.
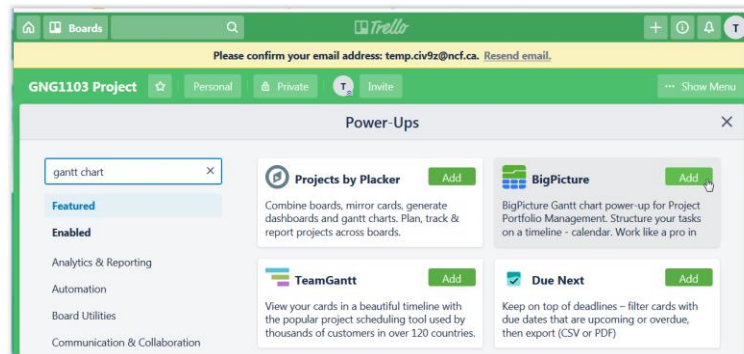

12. Click on the Home icon at the top left of the Trello window to take you back to the main Home screen and then select the *GNG1103 Project* board, which should now look something like the screenshot below (note that the BigPicture power-up is now shown at the top right of your *Trello* screen).
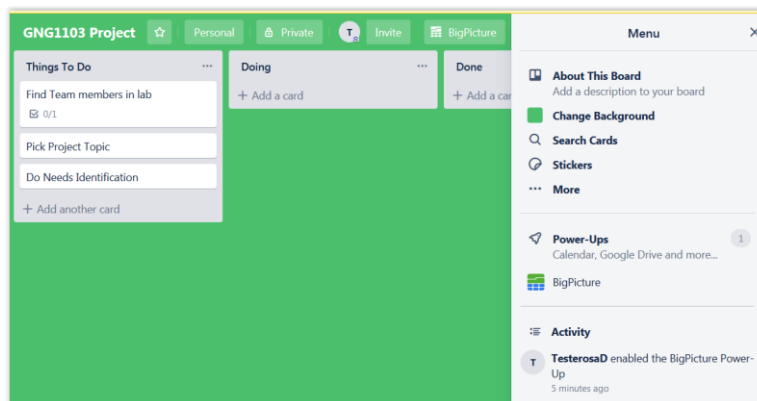

13. Since the project is just starting and there are lots of things you don't know yet, just capture all of the milestones for now in the "*Things to Do*" list category.

14. Note that you can make your Trello board *Personal* or *Private*, using the buttons at the top that are located next to your board name (i.e. to the right of *GNG1103 Project* label). Select *Private* and then *Team*. Give your team a name (e.g. "*Team YourNameHere*") and then pick "Create".
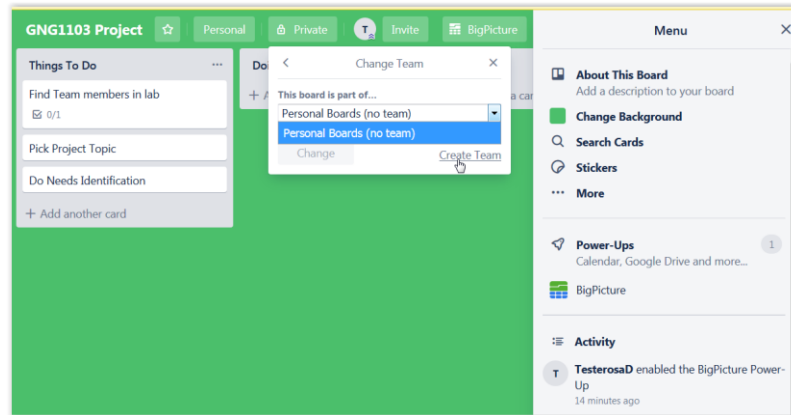
15. If you have already found your team-mates and know their email addresses, you can select the 'Members' tab and then invite them by typing in their email addresses and selecting "*Invite to Team*". If not, select the *Settings* tab and notice that you can link your team to a Slack board to simplify your future group communications using the Slack tool (https://slack.com/intl/en-ca/).
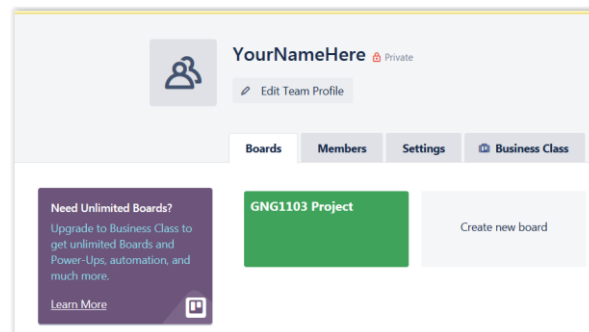

16. Select the *BigPicture* button at the top right and then "*Allow*" *BigPicture* to access your new board… then "*Allow*" it again. You will see a status message… Apparently, it is now time for coffee… Eventually, it should say "*Ready to Work! Click here to run BigPicture*". Do that and you should see a screenshot like the one below with a blank Gantt chart. You may need to stretch your browser window to see the right-most side of the screen with the "*Program Configuration*" button. Select this "Program Configuration" button.
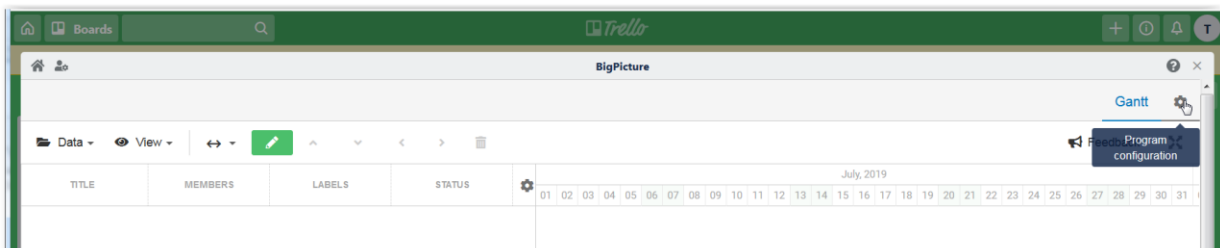

17. Next select the "Scope Definition" tab button and you should see something like the screen shot below, with your project (and the 3 tasks in it) shown. Click on the blue "Save" button and wait until the save operation has completed.
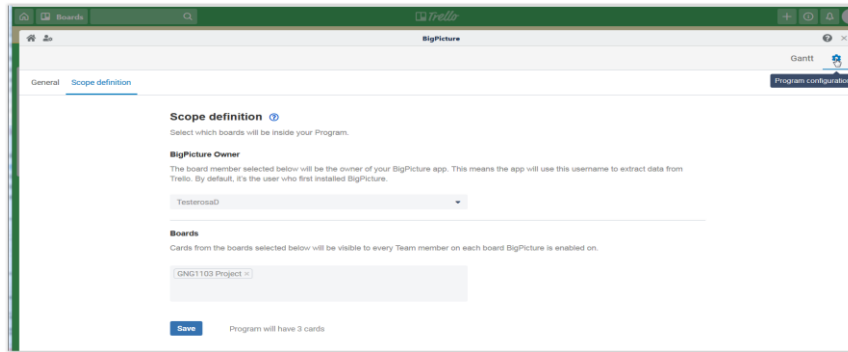
18. Click on the 'Gantt' tab to see the tasks in your project.
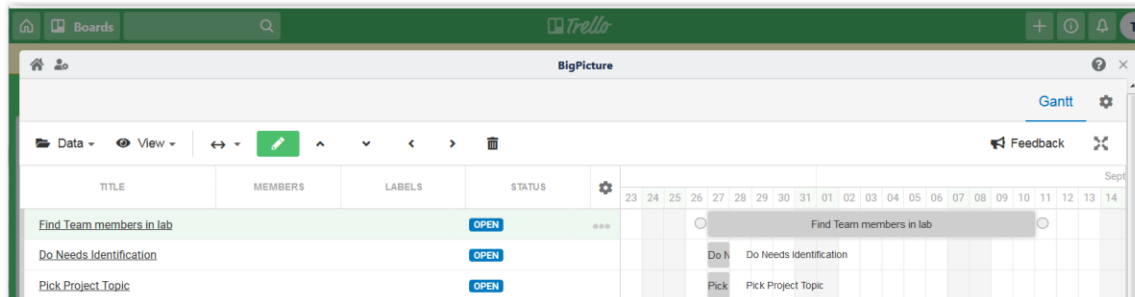
19. Adjust the durations by dragging the left or right edge of the grey bars left or right. Adjust the starting point of a task by dragging anywhere inside the grey bars for that task. Reorder tasks by dragging the task title up or down or use the '^' or 'v' move icons. To create a dependency, connect the circles, by clicking and dragging from the initial task to the dependent task. Clicking on the link inside the task bar will take you back into *Trello* to change the details for that task. To get back into the *BigPicture* Gantt chart from *Trello*, at any time, just click on the *BigPicture* button.

20. Once you are done with your editing, you should see something like the screenshot below. The tasks have been ordered logically, some dependencies have been added and the start dates and durations have also been adjusted appropriately.
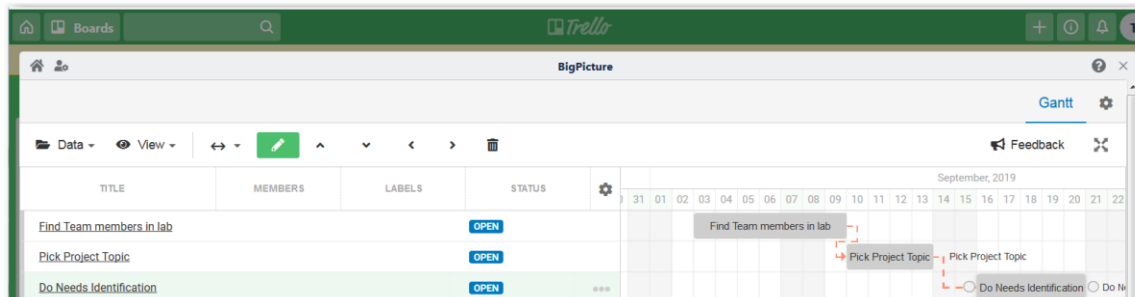

21. Clicking on the three dots underneath the settings cog icon for any task will allow you to adjust the properties of that task. For example, the default Task Mode is set to "*Auto*" which means that tasks dependent on other tasks cannot be started before the predecessor tasks have been completed. Try and see if you can move a dependent task in

front of the task on which it depends. You can't. If this is not what you want, then change the mode to "*Manual*", which will allow you to do what you want. This is not recommended, in general. The "*Task type*" can also be changed from the default "*Regular Task*" value to "*Milestone*" (a task with zero duration). This is the best task type for each of the project deliverables (i.e. deliverables A through K) although there may be other "*Regular Task*" tasks required to allow you to meet the different milestone task dates.
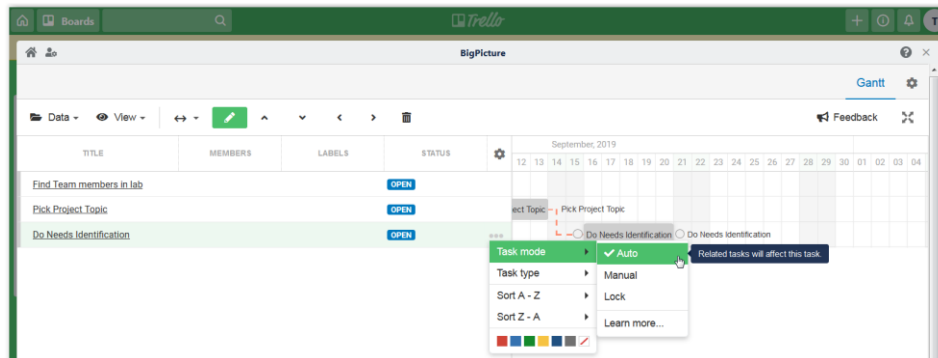

22. Experiment with the *Data*, the *View* and the *Gantt Scale* menus to see what they do. The default *Month* view or the *Quarter* view are probably the best ones for this project. You can trade off viewing compactness with task granularity.
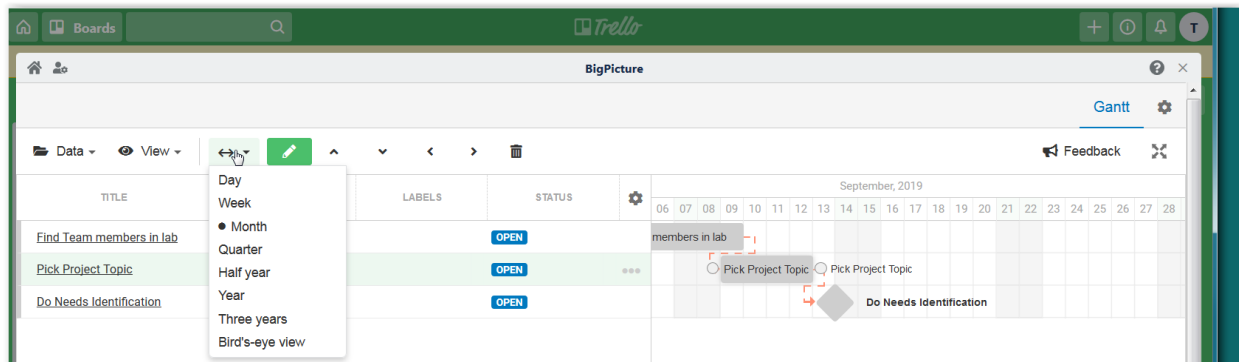

23. If you make changes to your *Trello* tasks, then selecting *Data/Re-Sync* will add the new tasks into your *BigPicture* Gantt chart. Note that Trello is always the master application and you should add new tasks there.

24. A hierarchy of tasks can be created when tasks are defined too vaguely (e.g. "*Solve World Hunger*"). With a hierarchy, some tasks can be broken down into more detailed constituent tasks. If there is no hierarchy at all, then the hierarchy is said to be "flat". A flat hierarchy of tasks has been created in *Trello* and shown in *BigPicture* below for the high-level task: "*Drink a cup of tea*" but there are also four more tasks, which are actually sub-tasks.
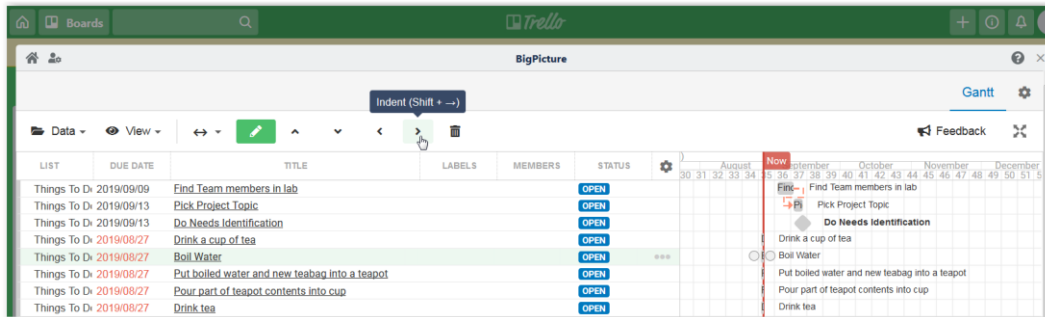
25. By selecting the first sub-task ("Boil Water") and then using the Indent icon (>) a hierarchy can be created, as is done below. This is useful when the task needs to be doable by a single person and assigned to a specific owner and then executed. For example, "Build Design Day final prototype" probably needs to be broken down to tasks like: "Complete Bill Of Materials", "Order Material", etc.).
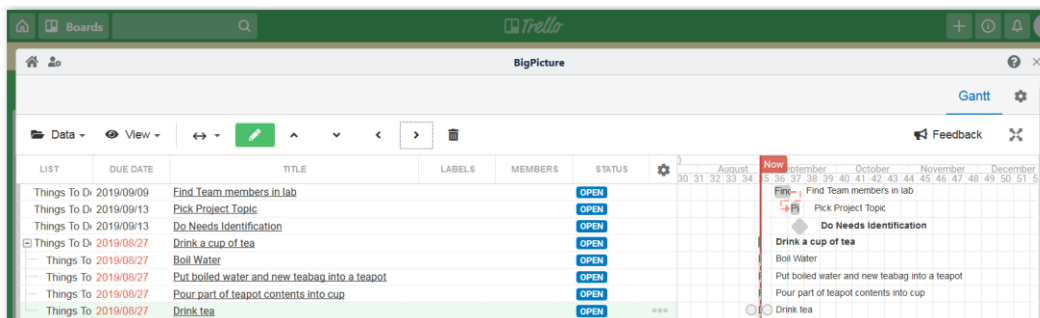
26. To assign an owner, click on the task name link from *BigPicture* or go directly to *Trello* by closing *BigPicture* and then selecting "*Members*". *Trello* allows multiple members to be assigned a task. However, it is probably better to have a **single owner for each task** so that it is *very clear who is responsible for what*. In the following screenshot, there is only one team member (*TesterosaD*) so this is easy.
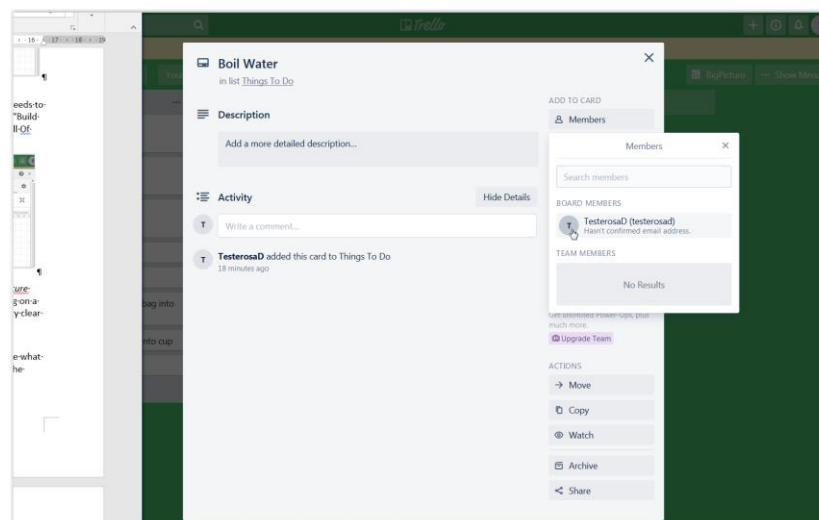
27. The resulting Gantt chart in *BigPicture* shows that *TesterosaD* (or '***T***' for short) is now the owner for the "*Boil Water*" task.