UBC Social Ecological Economic Development Studies (SEEDS) Student Report

Timber: Timber is a full-size, electromechanical tree. It dies if you are careless.

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It dies if you are careless.

Disclaimer: This “report” is not going to be formatted like you expect it to be. Expect a lot of me talking in first person, some of me doubting myself, and a few apologies. I want this to be conversational and honest. I’m also doing this because I’ve had basically no time to work on this and I want to get out as much information as possible, and organized in an easily readable format. I want you to know that I am serious about this project (I would love for it to be made into a full-scale thing, and I know others feel the same), but I like presenting things a little informally.

Those two sentences there under the title are my summary. I don’t think I can make it any more clear than that. Sorry.

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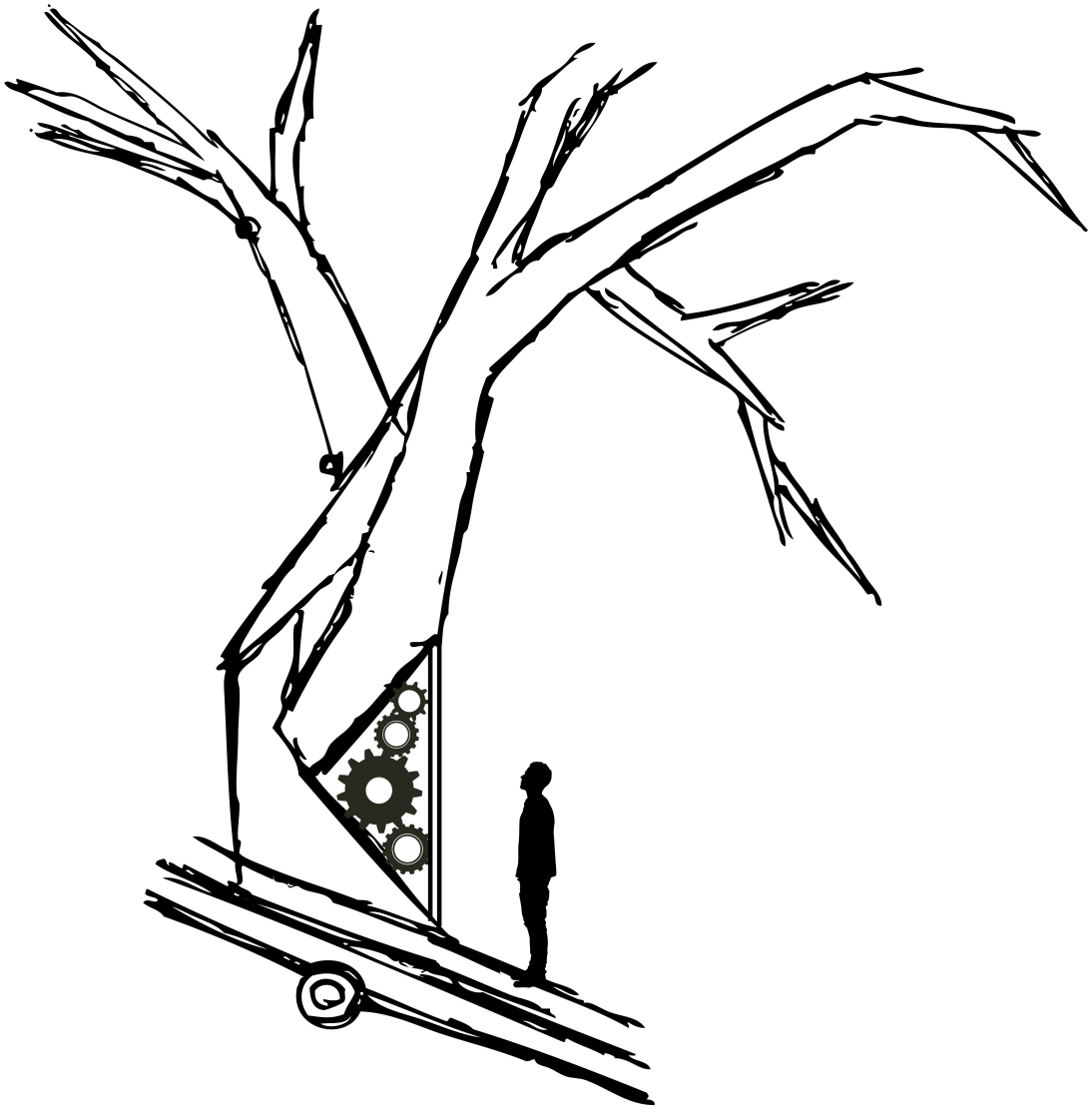


Student Engagement

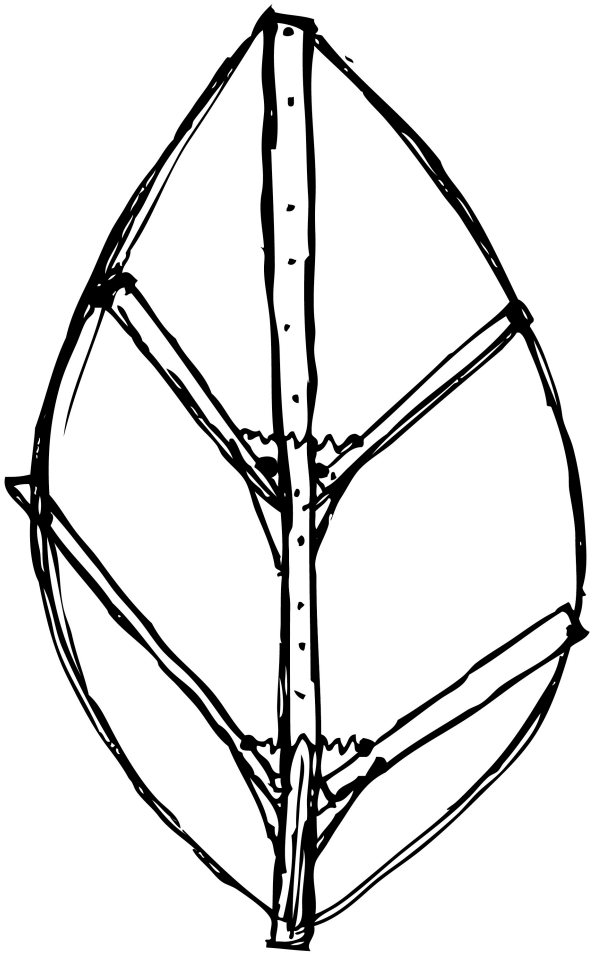
- If you touch it carelessly, it dies. If you're careful, it responds nicely.
    - Death can be a sudden collapse, or a slow wilting.
    - Life can be a subtle rustling of the leaves, determined by noise in the room and/or presence of people.
- It recovers over time through energy input.
- Imagine if you saw person touch it and they didn't know it was going to die?
    - How would they feel?
        - Freaked out?
        - Embarrassed?
        - On the spot?
    - How would you feel?
        - "I was in that spot once."

        - In on the joke?
- Statistics and data logging, accessible online.
    - Data can be uploaded in real-time from Timber to a computer/the Internet.
        - This means that Timber can be used as a gauge to measure how the student body is currently feeling.
            - More interaction with Timber should correlate to a more interactive student body.
    - I expect that people will want to kill Timber more often around midterm season.
- Look what you can do with recycled materials.
- There will be at least one open section (covered with acrylic) so you can see how it works inside.

- Response from the public during the showcase:
    - I talked to a woman about Timber for about half an hour. She loved the idea and wanted to bring her son in to see the prototype since he had a pro-D on the Friday. She knew her son would love it because he loves playing with building toys like K'Nex and LEGO, and loves robots. She also mentioned that the interaction with Timber was very much like gardening: if you put time and care into the plants, they will flourish, but if you are careless, they will die.
        - This is exactly one of the things I want to accomplish with this project. I'd say that Bill Nye is probably one of the coolest people ever, and to inspire others like he has would be one of the coolest things in the world.
    - Many people wanted a way to help Timber recover after dying. I was surprised and ecstatic that people were so concerned about this.
        - The best idea I heard was a way to "water" Timber like you would a plant.
            - Can be done by circulating water through a human-cranked water wheel/pump and generator to charge the batteries.
    - I talked to a girl extensively about Timber before she got a chance to look at the other projects. She said she loved my idea and the message, but wanted to check out the other projects before she cast her vote. She eventually returned to talk more about and vote for Timber. I don't remember any of the specifics of the conversation, but she was very excited that a project like this might actually happen.
    - Here is some other feedback from the comment cards:
        - "Very interactive, clever"
        - "Representative of the world"
        - "Juxtaposing capitalism and technology"
        - "Very reflecting, engaging"
        - "Creates awareness"
        - "Well thought and implemented"
        - "Great message"
        - "Beautiful"

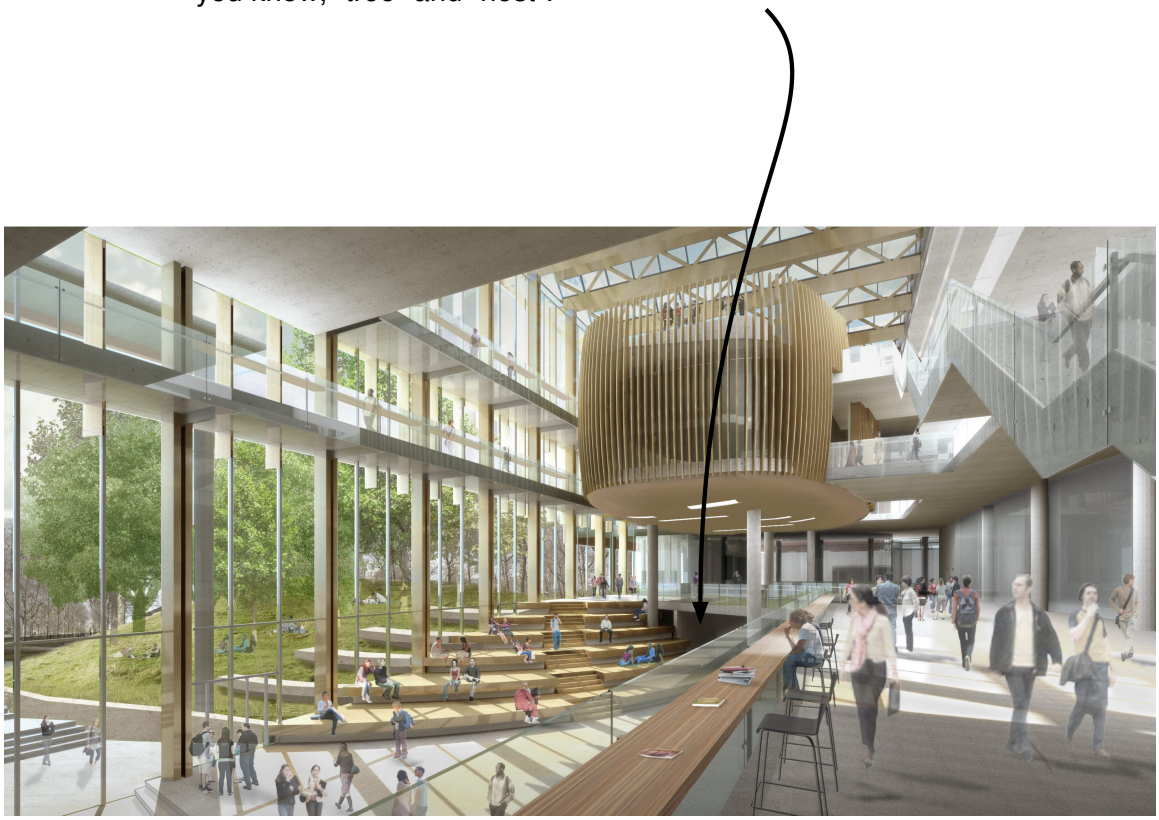
Integration

- Base and trunk take up little floor space.
- Branches and leaves form a canopy above.
    - Leaves like the one in the drawing below are placed on the branches (I didn't have them in that drawing on the first page). They are expected to wilt when Timber dies.



- The aesthetics are to jive with those of the New SUB atrium
    - I like the word "jive".
    - Angular plates of metal and acrylic cascade upwards from the terraced steps to form the trunk.

- It might go right about here, coming from an angle under the nest, with the branches mostly coming out over the main open air space over the staircase and the bottom of the staircase.
    - Its placement here might make the “nest” idea make a little more sense, you know, “tree” and “nest”.



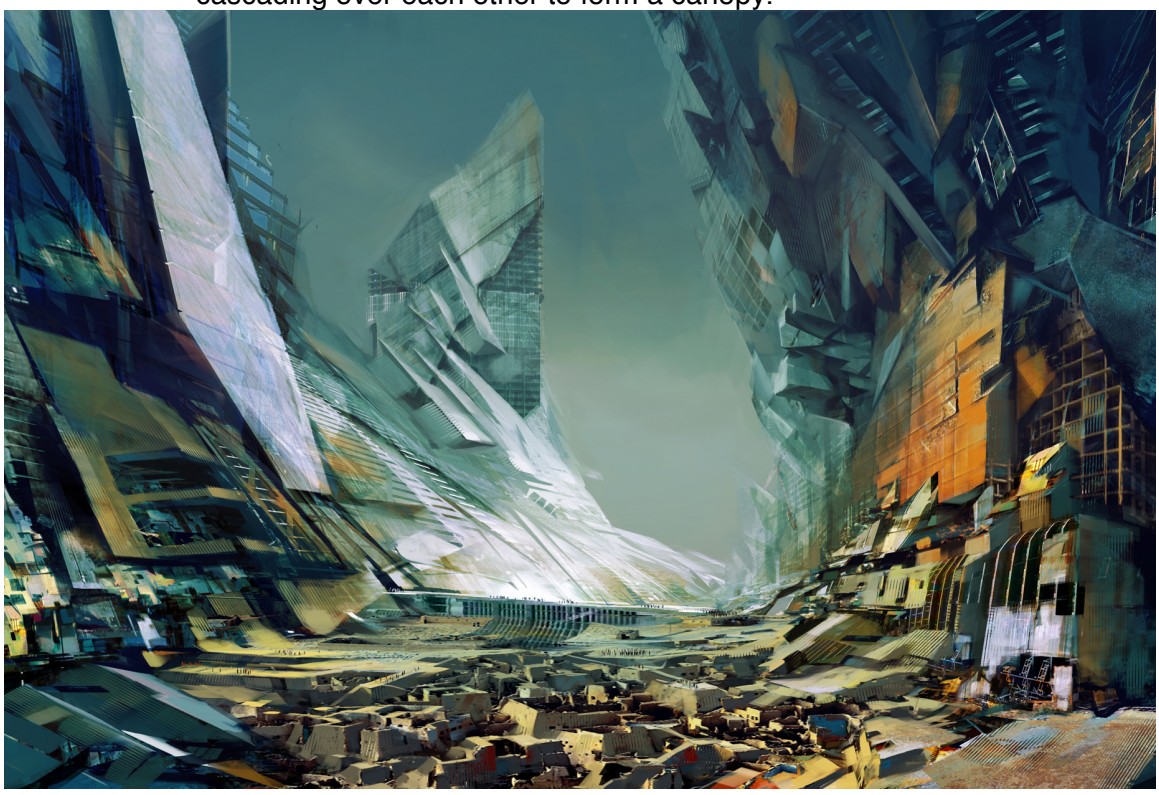
Sustainability and Reduction of Ecological Footprint

- Timber is made from UBC.
    - Made primarily (hopefully) of scrap/recycled materials, where the mechanics permit.
    - Materials sourced from around campus, such as waste from construction/renovation.
    - Collects its own energy from solar panels and user input.
- Prototype was partially made of scrap VCR cases found beside a garbage bin at Thunderbird Residence.
- Raises awareness: I want it to be obvious that much of it is made of recycled material, and the main interaction of Timber dying certainly makes people stop and think.

Inspiration/Themes

- Fragility and resilience of nature.
- Technological advancement of nature.
    - It is expected to act like a plant would. With the solar panels, it is affected by the weather and the seasons. Less sunlight means more time spent wilted.
- Replacement for trees on campus that have been taken down.

- I couldn't get any concept art done for it, but earlier, I came across concept art from the video game Guild Wars 2 (art by Daniel Dociu) that looked pretty much how I want Timber to look.
    - The first picture shows how I imagine the trunk (especially the tower in the background) and general aesthetic.
    - The second picture shows how I imagine the leaves to look (like sails), cascading over each other to form a canopy.



Longevity and Feasibility

- Safety:
    - With overhanging, metal branches, one of those falling could cause some serious damage.
        - There will need to be at least a 10ft (I think, according to OSHA regulations or something) clearance from the ground to an overhanging branch.
        - Support cables inside to prevent unwanted movement and as well as backup in case of failure of moving cables.
    - Will need to be bolted securely to the ground.
        - The motor needs to pull quite hard on the branches.
    - Main trunk will be made of a lattice of support bar, overlaid with metal/acrylic sheets. Branches are sheets of metal formed into triangular prisms with spines along the edges to provide extra rigidity.
    - Don't want anyone trying to climb it. The trunk will have to be designed in such a way that makes climbing impossible, probably if it is smooth, relatively wide, and triangular.
- Cost: $20 000 - $30 000
    - The largest contributions are from the motors and the material.
        - Each motor would cost about $3000 - $5000.
            - The cost would be reduced significantly if only one primary motor is used.

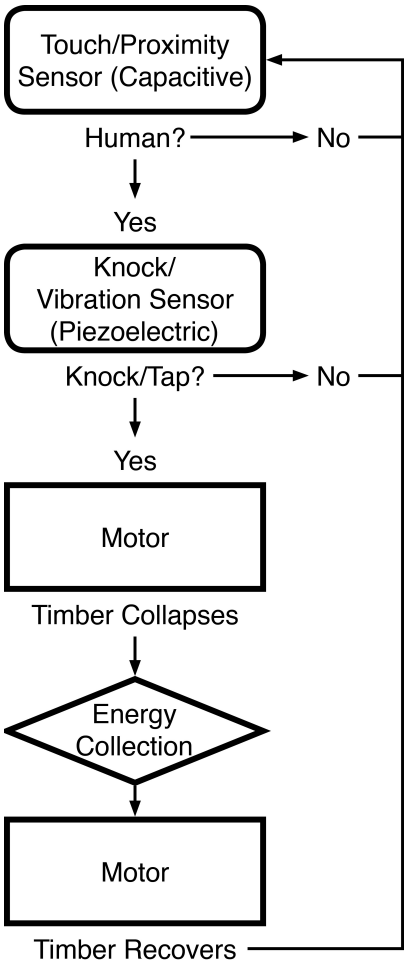
        - Makes it significantly more difficult for Timber to move in different patterns.
    - A 4' x 4' sheet of aluminum of a desirable thickness costs about $200. Say I needed 40 sheets, that would be about $8 000.
        - I hope that lots of material can be found/recycled from around campus. This would also reduce the cost.
  - Other significant costs are batteries and the appropriate electronics.
    - Solar panels can be made, and not bought. They are a lot cheaper to make than you think, and they are also not hard to make. There are great tutorials on YouTube.
        - This is a FANTASTIC opportunity for "**Education and Outreach**", since volunteers could make the solar panels, and they would learn how to make their own.
  - The sensory circuitry is relatively cheap, should be less than $200. I already have working versions of it, anyways.
- Longevity:
  - With the triangular prism branch construction, a face/panel of the prism can be easily removed/replaced and the internals serviced.
- Feasibility of construction:
  - The branches can be made individually, and attached to the trunk or previously placed branches.
  - Basically, the whole thing can be make into chunks which are then put together on location, with the help of a boom lift, of course.
- Some things that are desperately needed:
  - People with experience
    - I have basically no idea how to do any of the real building and construction. I just turned 21 and I'm only one dude with no real-world experience. I'm also very concerned with the safety.
    - I have enough knowledge of the electronics to make the sensors, but I don't have any experience with large-scale industrial electronics that include large motors, relays, and batteries.

- I made a working prototype out of a 15-year old K'Nex set, scrap VCR cases, and random parts and scraps lying around the Engineering Physics Project Lab.
  - I'm pretty sure that if I can make it out of those things, then a real version is totally possible.

- I've talked to two engineers, one about the feasibility in terms of the strength of the structure, and the other about a general estimate of the price.

- I have a few structural diagrams in my notebook that I couldn't really get into this report. I also didn't have time to make up anything nice in SolidWorks, but I'd totally love to, and like I said, I've conferred with two engineers about Timber, with my diagrams.

- How it works:



    - These were all demonstrated in the prototype except the energy collection (will be solar panels and human input). I had it plugged into the wall for that. This is all really best demonstrated in real life, or with a video.
        - Touch sensor:
            - The capacitive sensor works by connecting a wire to a piece of metal, and then sensing changes in the capacitance of the surrounding area.
                - It can be used as a proximity sensor as well as a pure touch sensor.
                    - This means it is possible to detect the number of people close to Timber, and how close they are.
                - Since Timber is entirely made of metal, it is one giant sensor.

            It checks if the interaction is human, and not an accident.
        - Knock sensor:
            - The piezoelectric sensor detects vibrations, and their strength.
                - Multiple sensors will have to be placed along the trunk since the vibrations dissipate as they travel.