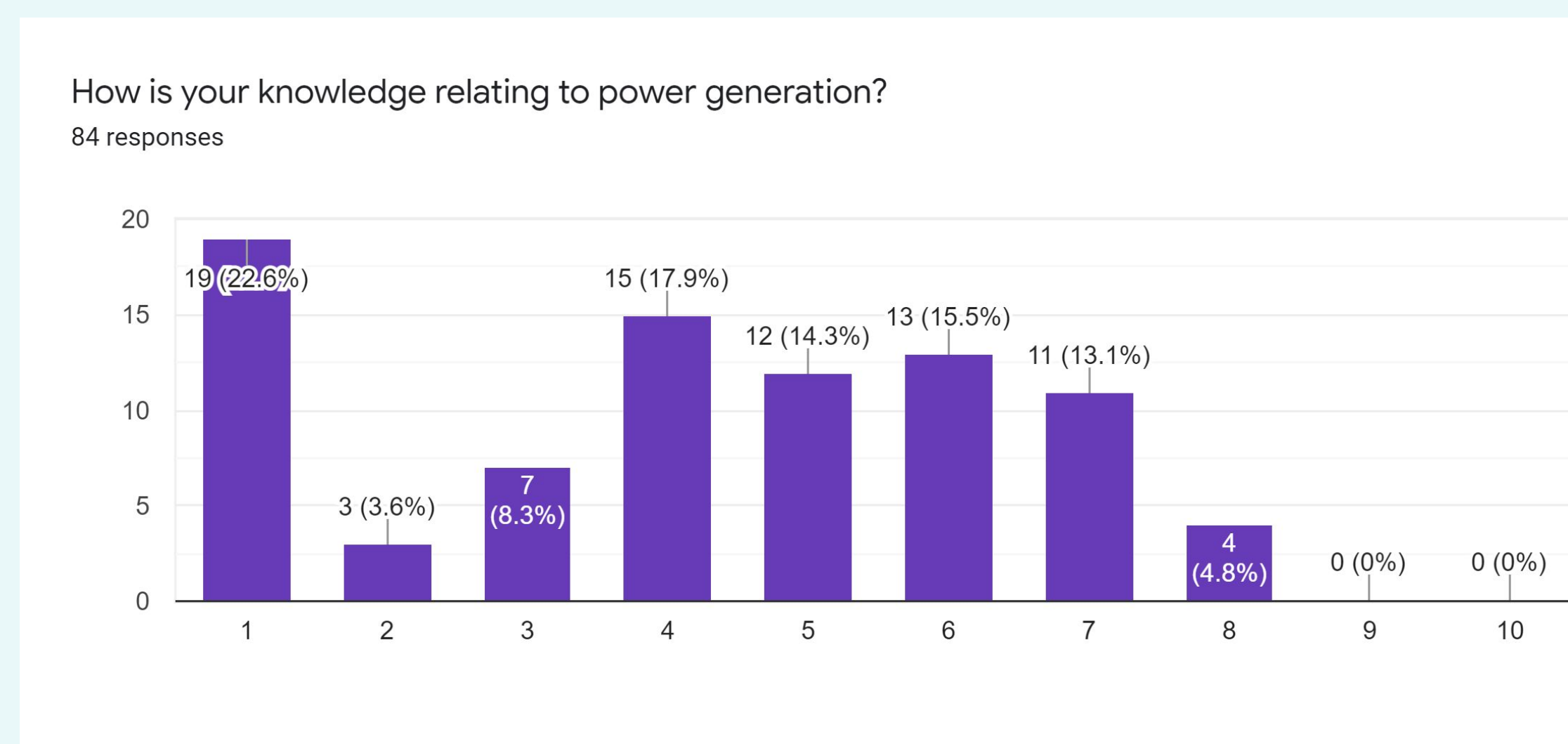


MIN - Teaching Power Generation

The Problem

Although power systems are used everyday by almost everyone in BC, many people lack the knowledge on the basics of how they work and how their design impacts the environment. Over half (52.4%) of people surveyed claimed to know very little, if not nothing about power generation and power systems.



Project Goal

The main goal of this project is to increase the base level knowledge of power generation through gaming. From our research, 21% of children under 18, and 38% of people in the age range of 18-34 are gamers [1]. Over 80% of the participants are open to learn from a game. Therefore, developing a web game related to power generation system is a commonly accepted way to educate the general public.

Design Method

Game development is a process which can take many years to obtain a final product. It was important for our design to establish a well built foundation for future work to be done. This will allow for future additions to the game which make it more educational, challenging, and fun to play.

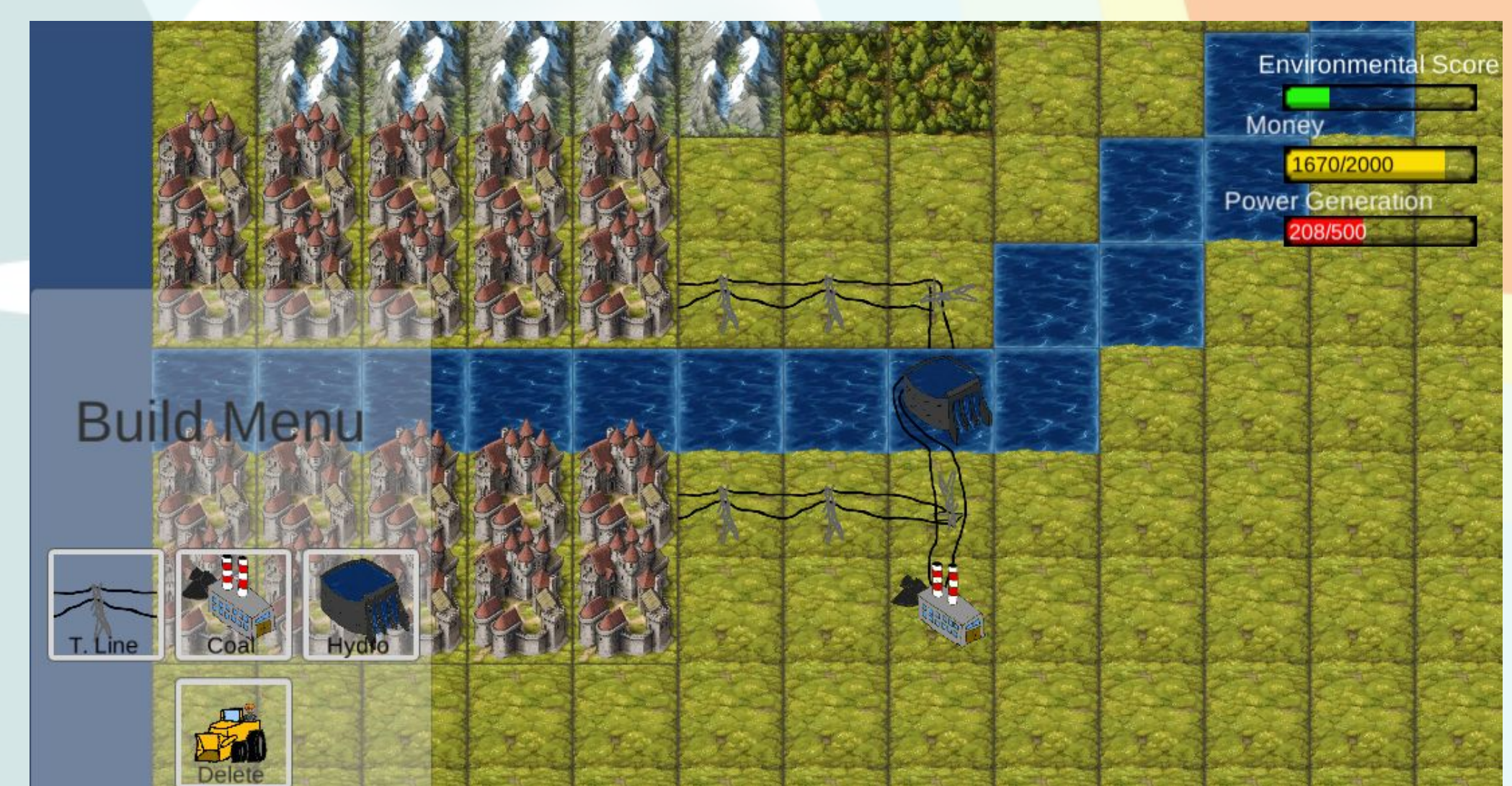
To illustrate the economical and environmental effects of power systems, it was important to provide the player with feedback on the decisions they make. It was decided this should be done by providing the player a budget and environmental score so they can visually see the effects their decisions are making. Providing the choice between a variety of power generation such as coal and hydro, gives the player the freedom to make these decisions appropriately.

Final Outcome

The final game prototype has two playable stages included. The main menu takes the user to the tutorial to allow them to get used to the game. The first level begins after this stage is complete. Level 1 includes a layout similar to BC where the user needs to provide a minimum power requirement by building power systems between one or both of coal or hydro from the build menu. The transmission lines connect the power to the cities. The game utilizes a pathing algorithm for transmission line placement called A-Star.

A-Star algorithm timing: 3.2 ms
Game Size: 17.1 Mb
FPS: 80

The online browser game can be played at the link below:
<https://simmer.io/@TannerO/powering-up-with-pretentious-pete>



Conclusion

The game is still a very early prototype, so further development is needed to provide more ways to teach more about power system concepts. The foundation has been designed in a way which will allow for additional features to be added such as new power sources and transformers, new environments, and wildlife. All of which will add more challenge to the game and more learning opportunities for the player. The final prototype is a playable game which educates the player on the environmental and economic choices they make in order to generate enough power to complete the stages. The player is provided with coal and hydro power generation methods, and transmission lines to connect them to cities. Testing and validation of the game features revealed that the prototype is successful in what it aspired to achieve. We hope to see this game develop new features in the future, and educate people on power systems and their effects.

Reference:
[1] J. Clement, *Distribution of video gamers in the United States in 2020, by age group*, Statista, July 2020. [Online] Available: <https://www.statista.com/statistics/189582/age-o-f-us-video-game-players-since-2010/>