Individual report pair programming project

Despite attempts to reach out bar the first response message I was unable to get a response from my partner so per instruction I completed this project solo, my disability tutor said I should mention this but I am unsure of to where so I will put a disclaimer here.

I began my development with the index html page fixing my mistakes from the previous project making the HTML CSS and JS separate pages, I began the project as a standard page with no theme or idea behind it, simply a landing page allowing the user to input their name and a submit button to start the game which took you to an empty canvas. Then I decided on the theme of space and knew I wanted to make the game more action based as I was told I could be creative with the aspects of shooting, my main inspiration being a tutorial for space invaders coded on HTML and java script I found on YouTube this allowed me to add more complicated gameplay creating a more fun game overall without making it too similar to my inspiration when I was stuck I made use of AI to help with debugging and some code generation after asking for permission via email my response being “You can use it as long as you reference it within your code block comment and report. John”

<https://gitlab.eeecs.qub.ac.uk/csc1030_23-24/duo-43/-/blob/main/IndexHTML>

To begin my code development I began with the basics all games should have such as a start game function. I then got more specific to the theme and decided to create a generate targets function for both targets that the user can shoot and enemies which were called negative targets as they decrease the user score, these functions spawned green squares for targets and red squares for enemies using fill rect as placeholders before I added images. The next step was to make the targets move. I had the targets spawn on a random point inside the boundaries of the canvas and move horizontally, at the time this was also true for the negative targets, I decided to create a separate function for move negative targets and chose to make them more erratic giving them noise and a random pattern which gave them an almost glitch effect across the screen enhancing the user experience as this made the game more complex and difficult increasing engagement, however I noticed as I continuously debugged and tested the game that it was boring simply creating more enemies and more targets each level. I fixed this by assigning a movement pattern for each level with the first level having the enemies move horizontal the same as the targets giving the user a very easy level to get adjusted to the mechanics of the game when the targets and enemies reached the edge of the boundaries they simply respawned on a random point on the canvas continuing the motion, I had an issue with the targets not reappearing after leaving the canvas early on. On the second level I decided to add vertical motion to the enemies while leaving the targets horizontal however the targets did not fall perfectly vertical to compensate for this I added physics to the game making the targets bounce off the edges of the canvas with a random speed between 1 and 3 to increase engagement, making the user think fast as they aren’t sure what speed the enemies will bounce back at. The third level I attempted to get the half of enemies to move in a horizontal formation and half to move in a vertical formation but I was unable to so they all moved in a diagonal formation I compensated by adding more enemies and giving them the same rule as the horizontal movement pattern having them spawn randomly on the canvas and continuing their motion kind of like falling meteorites. For the 4th level my goal was to create an X formation but I was unable so I settled for a random glitch effect movement as mentioned previously however this level serves more as a buildup the enemies are not moving very much almost as if they were beginning to enter their final stage of evolution. This is one of the easier levels allowing the user to have a bit of a rest to prepare for the final level which is without a doubt the most difficult. The final level is one which I am only able to complete half of the time I play it. The enemies have that angry shaking glitch effect but to a much greater degree coving more space and moving faster with a completely random movement pattern it is very difficult to predict where the enemies are this combined with the later added time limit mechanic made this level very hard allowing for greater engagement of the user.

<https://gitlab.eeecs.qub.ac.uk/csc1030_23-24/duo-43/-/blob/main/move%20target%20%20logic>

The next major gameplay mechanic I decided to add was the ability to shoot making the targets despawn if clicked using the shoot event listener and forcing the user to the end game summary screen instantly calling the end game function if a negative target is clicked, however if the user shoots all targets on the screen without hitting a negative the next level function will be called taking the user onto the next level and of course clearing the targets in all levels will once again call the end game function. While this was functional it was also boring so I decided to add the extra mechanic of ammo as I was inspired by the examples of carnival games linked in the spec adding points to the java script such as the const ammo making max ammo 10 bullets. I added aspects to the shoot function such as decrease ammo which decreased the ammo by 1 every time the user shoots whether it is a hit or not. In the event that the ammo dropped to 0 originally I tried to do this a complicated way making the targets and negative targets invulnerable but instead I simply removed the event listener for shoot which prevented the user from calling the shoot function until they clicked the reload button which brought ammo back to max ammo.

<https://gitlab.eeecs.qub.ac.uk/csc1030_23-24/duo-43/-/blob/main/shoot%20and%20reload%20logic>

The most frustrating aspect of coding I ran into was without doubt images, they took multiple days to implement and were making me panic and stim for a while AI was almost useless in fixing this suggesting I create 2 new methods to draw the images which did not work whatsoever, eventually I decided just to replace the fill rect of draw targets with the draw image versions instead which still didn’t work as I got the error telling me that the target was in a broken state I searched google and used AI to try fix this but I got no answer, eventually I changed the image and it worked, my suspicion is that jpegs are not compatible and I had to use a png. I also tried to make the gun work but it just never spawned and when I changed the code to make it spawn nothing moved so I prioritised gameplay over aesthetics and chose to abandon the gun image even and removed the on load function for gun which originally started the game.

The leaderboard was another issue I ran into however not as big of an issue, this was more due to the changes I continued to implement forcing changes to the leaderboard the first thing I added was a points system and decided give the user 5 points every time they shot a target, I then tracked the total duration of the game rather than the duration of the level like I was previously doing to get the overall score I decided to use 110 which is the accumulation of time limits for each level or the maximum of time each game can take minus the overall duration the user spent playing giving remaining time plus total points accumulated. Through the playthrough however I saw that this could be exploited as dying instantly meant you has a lot of time remaining and hence a high score so I also multiplied the score by the current level the user was on when they died this means those who die quickly will have a lower score than those to survived and shot more targets while also allowing the leaderboard to take into account the speed the user completed the levels to ensure everyone who beat the game will not have the same score, increasing competitiveness and engagement ordering the users from highest to lowest score and insuring only one user of each name can be displayed to avoid having multiple versions of the same player appear on the leaderboard.

<https://gitlab.eeecs.qub.ac.uk/csc1030_23-24/duo-43/-/blob/main/leaderboard%20logic>

My CSS is very basic other than the basic CSS skeleton the only new aspect I really added was the background jpg.

<https://gitlab.eeecs.qub.ac.uk/csc1030_23-24/duo-43/-/blob/main/stylesCSS>

The game summary was also quite simple I simply showed the user all of their stats after they completed the game including: shots fired, hits, negative hits accuracy overall duration and overall score.