



Test Project

Web Technologies

Day2 Client Side

Module C – Game Design and Features

Module D – Game Functions and Interactions

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Introduction:

"Target Star" is a front-end game developed using web technologies, accessible to players through their web browsers. The game offers both a Creative Mode and a Challenge Mode. In Creative Mode, players can use toolbox to design game scenes. In Challenge Mode, players can challenge their created maps or access game levels made by others through map uploads.

This project is divided into two parts:

- Phase one (morning): Complete the design of style guide and game page. Implementation of Page Functionality for main page and map editor page.
- Phase two (afternoon): Based on the style designed in Phase one, implement the required game interaction features.

Description of Project and Tasks:

First 2 hours - Game Design and Production

Style Guide:

You can design game elements based on your own creativity or materials. The "Target Star" game includes the following elements (The images following are for illustration purposes):

- Buttons:
 - The button specifications and styles to be followed in the interface.
- Character:



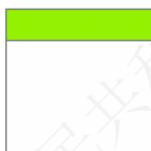
- Represents the player-controlled character in Challenge Mode.

- Spawn Point
 - The position where the player character appears on the map after entering the game. It occupies one cell on the map.
- Star:



- Players can control their characters to reach the stars. Obtaining all stars complete the level. It occupies one cell on the map.

- Base Blocks:



- A base block for the player character to walk on. Each Base Block occupies one cell. At the beginning of the game, a row of non-editable Base Blocks is generated at the bottom of the interface.

- Jump Spring:

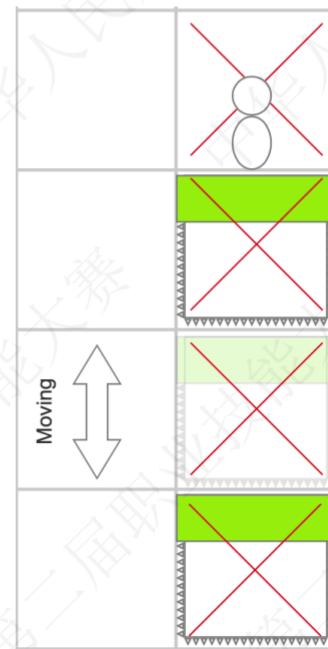
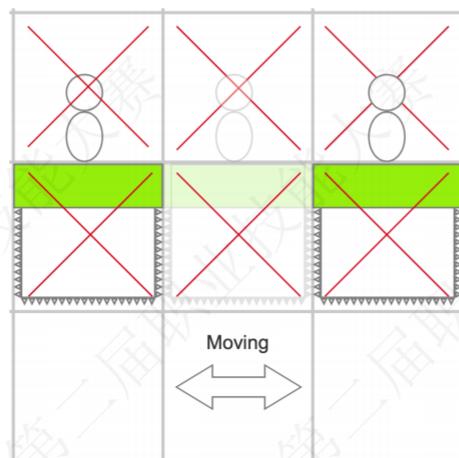
- When the player character jumps on the Jump Spring, the character will be bounced up and gain double jumping ability. During bouncing, the spring will have a compressed animation effect. It occupies one cell on the map.

- Sloped Blocks:



- A sloped block that players can walk on. Sloped Blocks can be connected with other Base Blocks. Sloped Blocks provide the character with a 45-degree slope, allowing them to directly walk from one Base Block to another higher Base Block. When the player character walks or stands on Sloped Blocks, the character will tilt according to the slope's angle. It occupies one cell on the map, but on the lower side of the slope, the adjacent cell cannot have any items placed except for stars.

- Moving Platform:





- A movable block that can move horizontally or vertically within a three-cell range (the cells within the moving range and cells above the platform cannot be occupied by other items, except for stars can be placed above the platform). Moving Platform follows a periodic movement pattern, and players can jump on or walk on it to move up - down, left - right. The left, right, and bottom sides of the Moving Platform have spikes; touching them will cause the player's character to die.

Main Page:

Main Page is the initial page that users see when accessing the game. It contains the following elements:

- "Map Editor" Button: Clicking this button will redirect to the Map Editor Page. This page's functionality needs to be implemented in Phase one.
- "Instructions" Button: Clicking this button will redirect to the Instructions page (This button should only be statically placed, and redirect will be completed in the Phase two).
- "Continue" Button: This button appears only after successfully uploading a map. Clicking it will redirect to the Map Preview Page, showing the most recent uploaded map (In this Phase, this button should be disappeared in the interface).
- "Load Map File" Button: Clicking this button to upload the created map. Upon successful upload, it will redirect to the Map Preview Page (This button should only be statically placed, and its functionality requirements will be completed in the Phase two).

Map Editor Page:

In the Map Editor Page, users use tools to place elements in the game and create fun through different combinations. The map is made up of multiple adjacent cells, with each cell being a square. Cells may not necessarily be visible on the map, but when placing items, they should be placed on cell and automatically aligned. The game should support at least 100 cells, the character can only move within the range of the map.

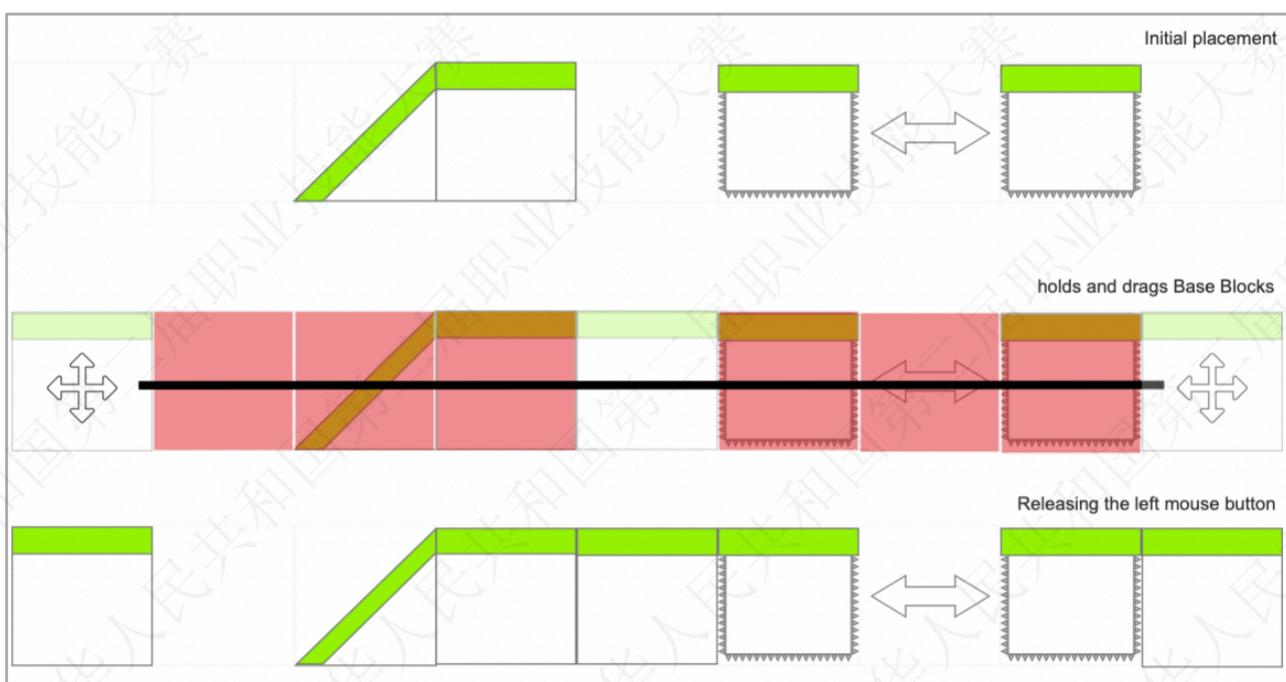
Users can switch between different levels by using the level selection buttons. Use the "Play Demo" button to play test and ensure that the current level's settings are reasonable. The page includes the following elements:

- Level Switch Button Group: It consists of three buttons for selecting different levels.
 - Players can switch to the game level they currently want to edit through the buttons.
 - When switching levels, the elements placed in the current editing level should be temporarily stored, and when switching back to a previously edited level, the elements placed in that level's interface will not remove.
- "Play Demo" Button: Once at least one Star and Spawn Point are placed together in the currently edited level, this button can be enabled. (This button should only be statically placed, and its functionality requirements will be completed in the Phase two).



- Clicking the button will start the current level's game in demo version. The character will spawn from the Spawn Point, and the player can control the character to move within the map and collect stars. Players won't be able to place any more items. The "Play Demo" button will change to a "Return to Editor" button, which is used to end the demo, and the others buttons will be hidden.
- Compared to the Challenge Mode, the demo version does not have timer, and the results will not be recorded in the ranking, the demo version does not have Hit Points, and the character will respawn directly at the Spawn Point if they die.
- If the player collects all the stars in the current level, the demo test for current level is passed. The Level Switch Button of the current level will be marked (Used to indicate that the current level has been validated). If the level is modified after the test, the mark will disappear.
- Toolbox: The toolbox area contains tools for placing elements, including Spawn Point, Star, Base Blocks, Jump Spring, Sloped Blocks, Moving Platform, and Remove Tool.
 - Only one Spawn Point and at most three stars can be placed in the same level. There is no limitation on the number of other items that can be placed. The Remove Tool is used to delete selected placed items.
 - When selecting Spawn Point, Star, Jump Spring, or Sloped Blocks, the user enters the placement status. When the mouse hovers over a valid position for placing the item, a transparency preview effect will be displayed. Left-clicking will place the item, and right-clicking will exit the placement status.
 - When selecting the Remove Tool, the user enters the removal status. When the mouse hovers over an item that can be removed, the item will be highlighted in red. Left-clicking will remove the selected item, and right-clicking will exit the removal status.
 - When selecting Base Blocks, the user enters the placement status. When the mouse hovers over a valid position for placing the item, a transparency preview effect will be displayed. If the user holds the left mouse button and drags it in a valid area, it can preview the effect of connecting multiple Base Blocks in the same direction (horizontal or vertical based on the mouse movement). If the preview connecting multiple Base Blocks area including occupied cells, the invalid cells will be highlighted in red. Releasing the left mouse button will place the blocks according to the preview effect (invalid cells will not be changed). If the mouse cursor moves out of the placement area (holds the left mouse button), the preview effect will be disappeared (Nothing be changed). The design of the connected Base Blocks can be customized to maintain a coherent style, and it is not necessary to preserve each individual Block as a separate style. Right-clicking will exit the placement status.
 - When selecting Moving Platform, the user enters the placement status. When the mouse hovers over a valid position for placing the item, a transparency preview effect with opacity will be displayed (occupied cells in the horizontal or vertical direction should also be visually indicated). Pressing the 'R' key or 'r' key will switch between horizontal and vertical movement directions, and right-clicking will exit the placement status.
 - In the placement status, if the mouse hovers over an occupied placement position, the preview status should display a different transparency effect (e.g., turning red), and left-clicking should be disabled to place items in occupied positions.

- Home Button: Clicking this button will prompt a message "Map changes are not saved. Do you want to return?" Clicking "Confirm" will redirect to the Main Page.
- Load Button: Clicking this button will prompt a message "Map changes are not saved. Do you want to Continue?" Clicking "Confirm" will allow users to import map and overwrite the current editing map. After loading, the Level Switch Buttons will all be in the Passed marked. The player can edit the levels based on the loaded map, if the level is modified the mark will disappear (This button should only be statically placed, and its functionality requirements will be completed in the Phase two).
- Export Button: When all three levels are passed the test, this button will be enabled. Clicking it will export a JSON file that can be used for importing game maps (This button should only be statically placed, and its functionality requirements will be completed in the Phase two).



Game Page :

- Game Interface
- Hit Points
- The display of the current level
- Timer: Formatted as mm:ss.SSS
- Home Button
- Pause Button

Map Preview Page:

- Level Preview Area



- "Start Game" Button:
- "Rank" Button
- "Edit" Button
- Home Button

Second 3 hours - Game Functionality and Interaction

Instructions page

In the Instructions page, you need to introduce this game to the users. The page includes the following elements:

- At least a group of graphics and text to introduce the game.
- Home Button: Clicking this button will redirect to the Main Page.

Map Preview Page:

In the Map Preview Page, the user can preview the uploaded map and view the rankings. The page includes the following elements:

- Level Preview Area: It contain three preview images of the maps, one for each of the three levels. The preview images will present the placement of elements made by the player in the Map Editor.
- "Start Game" Button: Clicking this button will redirect to the Game Page and load the first level of the game.
- "Rank" Button: Clicking this button will redirect to the ranking page, where the rankings associated with the current map will be displayed. When importing other maps, the ranking page will be cleared.
- "Edit" Button: Clicking this button will redirect to the Map Editor Page, and the game will load the currently imported map. After loading, all Level Switch Buttons will be in the Passed state.
- Home Button: Clicking this button will redirect to the Main Page.

Game Page :

Upon entering the Game Page, the player will be automatically generated at the spawn point position (the spawn point will not be displayed), and the timer will start counting from 00:00.000. The game will load levels in sequence, and after completing one level, game will give a victory prompt, and the player can proceed to the next level by clicking a button. Then the game proceeds to the next level. Once all three levels are completed, the player will be asked to input a nickname, and upon submission, the date will be submitted, the game will be redirected to the Ranking Page.

The Game Page includes the following elements:



- Game Interface: This displays the placement of elements that the player designed in the creative mode. The player can control the character to move within this interface. The objective of the game is to collect all the stars in the current level. Once all stars are collected, the timer for the current level will stop, and a victory prompt will be shown.
- Hit Points: Each level starts with 3 hit points. When the player's character touches specific items, it will consume hit points. If hit points are fully consumed, the character will die and respawn at the spawn point (the timer will not reset). When hit points reach 0, the game over prompt will appear, with a "Retry" Button. Clicking will start the game from the first level, and both the timer and Hit Points are reset. When the player enters the next level, the hit points will be reset. To maintain aesthetics, you can use appropriate icons to represent the number of player's hit points.
- Current level: The game has three levels. Displaying the current level here.
- Timer: Formatted as mm:ss.SSS, reset upon entering the next level.
- Home Button: Clicking this button, the game will be paused and displayed a prompt "Do you want to return?" Upon confirmation, the player will be redirected to the Main Page.
- Pause Button: Clicking this button will pause the game, stop the timer, and the player's character will stay in place and cannot be controlled. Clicking the button again will resume the game.

After entering the game, the player can use the keyboard keys A or D to move the character left or right. The character can move to different positions within a single cell instead of taking one step per cell. The W key can be used to make the character jump. If the player holds the A or D keys and then presses the W key, the character will perform a jump in the moving direction (useful for jumping on a step). Game elements should not clip through each other during movement.

You should enhance the animations of elements in the interface to improve the visual effects.

Ranking Page:

The Ranking Page records the data of players who successfully completed all three levels of the current map. It displays the Time used and Hit Points residual for each challenge in the three levels. The page includes the following elements:

- Level 1: Rank, Nick Name, Time, Hit Points
- Level 2: Rank, Nick Name, Time, Hit Points
- Level 3: Rank, Nick Name, Time, Hit Points

Each level's rank is independently in ascending order based on the time taken. If the time is the same, the sorting is done in descending order based on hit points. In the case of both time and hit points being the same, the player who submitted their data first will have a higher rank.

The page also includes the following buttons:

- Home Button: Clicking this button will redirect the player to the Main Page.
- "Retry" Button: Clicking this button will load the first level of the game and redirect the player to the Game Page.



In the interface, you can hide certain information and present it interactively. Button names can be represented by corresponding icons or text to convey their meanings, if they are wrapped inside " " marks.

Instructions to the Competitor:

Follow these instructions to submit your work:

1. Save your design files in a folder named " {your_server_address}/XX_Module_C/design/" (XX is your workstation code).

File names:

- Game Page: XX_game.png or XX_game.jpg
- Map Preview Page: XX_map_preview.png or XX_map_preview.jpg
- Style Guide: XX_Styleguide.png or XX_Styleguide.jpg

You can save additional design files for multiple scenes or interaction explanations. For example, file name: XX_Styleguide_NN.jpg, where NN is the number of the scene (if it exists).

2. Save the working game in the directory "XX_Module_C" in Phase one and "XX_Module_D" in Phase two on the server. Ensure that your main file is named index.html.
3. Use meaningful variable names and document your code as much as possible so that others can easily understand and modify your work in the future.
4. The "redirect to" mentioned in the document does not require performing different URL redirections. Instead, it should be done through internal navigation within the application.