

# Game Design Project

Now you get to build your own game! You are to design and implement a first person action game. The theme, rules, and content of the game are up to you. Check with the instructor early to confirm that your game idea will meet all of the necessary criteria.

## 1 Your Task

Your task is to design and implement a first person action game that requires the player to interact with the sprites on the stage to play the game. This will typically involve movement and manipulation of character(s) that are represented by a sprite or sprites on the stage. These sprites will typically interact with other sprites that are part of the game's setting and are controlled by the game, e.g., obstacles, opponents, etc.

You will need to decide on the game's theme, setting, genre, world, story line, actions, etc. Once you have settled on a high-level idea for your game, you will need to answer some low level questions as well:

- How will the player move? With the mouse? With the keyboard? Can the player move in all directions or are they limited?
- What is the objective of the game? Will you include enemies / negative game objects? What about rewards / positive game objects?
- How will the player win / complete the level? How will they lose?
- How will the player know how well they are doing as they play?
- How will additional levels differ from the first one?
- How will you communicate the purpose, rules of the game to the player? How will the player know how to play?

Be sure to document your work as you proceed. In addition to the completed game, you will need to submit a Technical Manual and User Manual at the end of the module. The details of these are provided in the report guidelines.

## 2 Where to Start

From the design perspective, answer all of the above questions. Have your idea worked out on paper before starting implementation. Be sure to check with the instructor to ensure that your game has a reasonable amount of complexity: Neither too little or too much. See the grading scheme below to gauge the scope of the project.

You can divide the work into implementation, backdrop design, sprite art, sound design, etc. Determine what backdrops and sprites your game will need and divide the work among your team. While only one person can code at a time, a lot of the art and sound design can be done in parallel.

For each sprite figure out what its behaviour will be and what it is intended to do. How will it interact with other sprites? You will need this information when you begin writing scripts to implement the sprite.

For the main implementation, start with the first loop that you built when creating the Brick Breaker game—the loop that generates the “FRAME” messages. This event loop is what drives the game. Start adding the sprites and backdrops to the game, incrementally implementing the required functionality. For example, in the Brick Breaker game, the first thing we did is we got the paddle moving, then we got the ball to move and bounce, then we got the ball to bounce off the paddle, etc. Don’t try to implement everything at once: That is a recipe for disaster. Test your game after each increment of implementation and fix any problems you encounter before proceeding to the next part.

### 3 Grading Scheme

Use the following rubric to guide you as you develop your game. In other words, if you still have not added the code necessary to move your player, do not spend all class to make the game look cooler. Save the special graphics, sound effects and other features until you have a working game.

F	No game created.
D	Sprites are moving on the stage, some interaction between sprites but game is not playable.
C-	Player movement is successfully added to the game.
C	The game tracks collisions between the player and game objects and responds to them.
C+	The game has a clear objective (including the use of positive and/or negative game objects).
B-	The player is able to easily track their progress through the game (in the form of points or some other measure / approach).
B	Winning and losing the game are both possible and the game rules, purpose and how to play are clearly communicated to the player.
B+	The game includes multiple levels which increase in difficulty.
A-	The game has some polish (looks OK) and includes audio effects.
A	The game is polished (looks good) and has some interesting special effects.
A+	The game is highly polished (looks really good) and is compelling.

Each grade cumulatively builds on the criteria for the lower grades. Therefore, to achieve a grade of C, your game must not only respond to collisions between the player and game objects but also enable successful player movement. This represents half of your mark in the project. The other half of the grade comes from your technical and user manuals.

If your game design is nonstandard in some way (for example, the player does not move), you must make a special case for this to your instructor early in your work on the game. The lack of a required aspect of the game may be permitted but only if the request is made before the final project lab period. Otherwise, you will be graded based on the rubric above. In other words, if you have a stunning game but the player does not move, you will only be given a D. Therefore, you must design at least the basics of your game and be able to answer the questions listed above before you begin to program and modify the project files.

## 4 Project Report Guidelines

At the end of this module, you will submit a Technical Manual (80%) and a User Manual (20%). Together, these will document the game that you developed for your project. The detailed requirements for each of these are given below.

### 4.1 User Manual

This is the written up instructions for how to play the game. If you were to sell your game, this would be the manual your users would read in order to know how to play and what to expect. The user manual should comprise the following sections:

**Title Page** : This page should contain the name of your game, the names of the developers, and a screen shot from the game play. This is the cover of your manual. It should get the users excited about playing the game.

**Game Overview** : Use at least one paragraph to describe the purpose of the game. For example, in the Brick Breaker game, the purpose is to break the bricks by bouncing one or more balls off of the paddle. Describe how this purpose relates to winning the game. Show screen shots here.

**Rules** : Describe what must happen in the game and the consequences of this not happening. For example, the ball must bounce off the paddle and not off the bottom of the screen in the Brick Breaker game. The consequences of the ball hitting the bottom of the screen were the loss of lives. Also use this section to describe how the player gets points (if you use points in your game).

**How to Play** : In this section, provide the player with specific instructions on how to operate the player and, if you have multiple levels, describe the differences between these. Describe the different sections of the screen and what they mean. For example, if you have enemies in your game, include images of them and describe how the player interacts with them.

The user manual must be *no more than 3 pages in length*, including images and the title page.

### 4.2 Technical Manual

The purpose of this document is to provide a detailed description of how your game works behind the scenes: the code. It should be clear enough that someone who has never worked with your game but whose Scratch skills are at the same level as the average person in the class would be able to use this manual to continue to improve your game. Imagine you have just finished an internship with a game development company and your project will be passed on to another employee. Your technical manual must provide the details that employee would need to continue to develop your game into a success. The technical manual should comprise the following sections:

**Title and Author Information** : The name of the game should be the title of this manual. Along with this, you must list the names of the game developers (you) and the current date.

**Introduction** : Provide a brief description of the game—the goals, how it works. Not many details are required because the User Manual will explain all of this in greater depth.

**Description of Concept** : Describe the game's genre, mechanics, and story. This description should include the the world, characters, and quest of the game story; the rules, environment,

actions, chance, and skills which comprise the mechanics of the game; and how everything comes together to support the unifying theme.

**Description of Sprites** : Use at least one paragraph to describe each of the important sprites that implement the game. For each sprite state its (i) name, (ii) purpose, (iii) behaviour (iv) variables, (v) messages it receives, and (vi) interaction with other sprites. **Be sure to justify your design decisions.**

**Description of the Stage** : In one or two paragraphs, describe the behaviours, messages, and actions performed by the stage. E.g., in the Brick Breaker game the state runs the main event loop, manages the sound effects, and keyboard events. **Be sure to justify your design decisions.**

**High-level Description** : Use a couple paragraphs to describe the high-level interaction between the sprites and stage described in the previous two sections. This section is intended to bring together the descriptions from the preceding two sections. You may also wish to talk about all the global variables in your program and how they are used. **Be sure to justify your design decisions.**

**Description of Important Scripts** : Use a couple paragraphs to describe the scripts associated with the sprites and the stage. Feel free to include the code in this section and refer to it. Use screen capture to copy code and import them into this report. **Be sure to justify your design decisions.**

**Description of Artwork and Sound** : Use a couple paragraphs to describe the artwork and sound in the game. If you used stock art or sound from existing libraries, cite the sources. If you developed your art or sound work, explain your design decisions.

**Future Work** : Describe what could be done to expand this game. If you have any errors that you could not fix, use at least one paragraph to explain each of these.

The technical manual must be *no more than 7 pages in length*, including images and the title page.

In both the user manual and the technical manual, standard conventions for grammar, word use, spelling, citations, headings, paragraphs, figures, and tables are expected. Templates of these manuals are provided on the course website (<http://moodle.cs.dal.ca>) so you know how they should be formatted.

Both manuals will be marked using the rubric<sup>1</sup> in Table 1.

## 5 Deliverables

There are three deliverables:

- Game** the .zip file that can be downloaded from the Scratch project editor
- Technical Manual** in PDF or Word format
- User Manual** in PDF or Word format

The *game* is due at the day before the presentation period for this module because you will be presenting it to you peers during this period. The technical and user manuals are due on the day and time specified in the syllabus. All files must be submitted via [moodle.cs.dal.ca](http://moodle.cs.dal.ca) and the reports must also be submitted in hard-copy.

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<sup>1</sup>Based in part on Fleming, “Grading Rubric for Written Assignments”, CSCI 2100, 2011

	Exceptional: A	Acceptable: B	Substandard: C-D	Unacceptable: F
<b>Content and Structure (50%)</b>	Contains all required information. Ideas well organized and logically laid out always or almost always.	Contains most of the required information. Ideas well organized and logically laid out with competence.	Contains some of the required information. Minimal organization and logical progression of ideas.	Is missing most of the required information. Little or no organization or logical flow of ideas.
<b>Analysis and Depth (30%)</b>	Identifies and explains all issues and design decisions. Considers the issues from multiple points of view. Shows superior understanding of subject.	Identifies and explains most of the issues and design decisions. Shows commonplace understanding of subject.	Identifies and explains some of the issues and design decisions. Shows partial or limited understanding of the subject.	Identifies and explains few of the issues and design decisions. Shows a great deal of misunderstanding about the subject.
<b>Presentation, Style &amp; Tone (20%)</b> Standard conventions for grammar, word use, spelling, citations, headings, paragraphs, figures, and tables. Word choices set appropriate style and tone.	Always uses standard conventions. The document looks professional. Shows exceptional use of tone and style. Speaks to the reader with precise, concise, appropriate language, and choice of words.	Mostly uses standard conventions. The document could use some editing. Shows competent use of tone and style. Makes good word choices.	Does not consistently use standard conventions. The document requires significant editing. Shows minimal attention to tone and style. Shows poor usage or ineffective word variation.	Standard conventions are flouted. Document is unreadable. Shows little or no understanding of appropriate tone. Uses inappropriate language and word choice.

Table 1: Rubric for Written Reports