So Long

And thanks for all the fish!

Summary:
This project is a small 2D game.
Its purpose is to have you work with textures, sprites,
and other basic gameplay elements.

Version: 5.0

Contents

Chapter I

Foreword

Being a developer is advantageous when creating your own game.

However, a good game requires quality assets. In order to create 2D games, you will have to search for tiles, tilesets, sprites, and sprite sheets.

Fortunately, some talented artists are willing to share their works on platforms like: itch.io

In any case, ensure that you respect other people's work.

Chapter II

Objectives

It is time for you to create a basic computer graphics project!

`So Long` will help you improve your skills in the following areas: window management, event handling, colors, textures, etc.

You are going to use the school's graphical library: the `MiniLibX`! This library was developed internally and includes basic necessary tools to open a window, create images and deal with keyboard and mouse events.

The other goals are similar to those of the first part of the common core: being rigorous, improving `C` programming skills, using basic algorithms, conducting research, etc.

Chapter III

Common Instructions

- Your project must be written in C.
- Your project must be written in accordance with the Norm. If you have bonus files/functions, they are included in the norm check, and you will receive a `0` if there is a norm error.
- Your functions should not quit unexpectedly (segmentation fault, bus error, double free, etc.) except for undefined behavior. If this occurs, your project will be considered non-functional and will receive a `0` during the evaluation.
- All heap-allocated memory must be properly freed when necessary. Memory leaks will not be tolerated.
- If the subject requires it, you must submit a `Makefile` that compiles your source files to the required output with the flags `-Wall`, `-Wextra`, and `-Werror`, using `cc`. Additionally, your `Makefile` must not perform unnecessary relinking.
- Your `Makefile` must contain at least the rules `$(NAME)`, `all`, `clean`, `fclean` and `re`.
- To submit bonuses for your project, you must include a `bonus` rule in your `Makefile`, which will add all the various headers, libraries, or functions that are not allowed in the main part of the project. Bonuses must be placed in `_bonus.{c/h}` files, unless the subject specifies otherwise. The evaluation of mandatory and bonus parts is conducted separately.
- If your project allows you to use your `libft`, you must copy its sources and its associated `Makefile` into a `libft` folder. Your project's `Makefile` must compile the library by using its `Makefile`, then compile the project.
- We encourage you to create test programs for your project, even though this work **does not need to be submitted and will not be graded**. It will give you an opportunity to easily test your work and your peers' work. You will find these tests especially useful during your defence. Indeed, during defence, you are free to use your tests and/or the tests of the peer you are evaluating.
- Submit your work to the assigned Git repository. Only the work in the Git repository will be graded. If Deepthought is assigned to grade your work, it will occur

after your peer-evaluations. If an error happens in any section of your work during Deepthought's grading, the evaluation will stop.

Chapter IV

AI Instructions

Context

During your learning journey, AI can assist with many different tasks. Take the time to explore the various capabilities of AI tools and how they can support your work. However, always approach them with caution and critically assess the results. Whether it's code, documentation, ideas, or technical explanations, you can never be completely sure that your question was well-formed or that the generated content is accurate. Your peers are a valuable resource to help you avoid mistakes and blind spots.

Main message

- Use AI to reduce repetitive or tedious tasks.
- Develop prompting skills — both coding and non-coding — that will benefit your future career.
- Learn how AI systems work to better anticipate and avoid common risks, biases, and ethical issues.
- Continue building both technical and power skills by working with your peers.
- Only use AI-generated content that you fully understand and can take responsibility for.

Learner rules:

- You should take the time to explore AI tools and understand how they work, so you can use them ethically and reduce potential biases.
- You should reflect on your problem before prompting — this helps you write clearer, more detailed, and more relevant prompts using accurate vocabulary.
- You should develop the habit of systematically checking, reviewing, questioning, and testing anything generated by AI.
- You should always seek peer review — don't rely solely on your own validation.

● Phase outcomes:

- Develop both general-purpose and domain-specific prompting skills.
- Boost your productivity with effective use of AI tools.
- Continue strengthening computational thinking, problem-solving, adaptability, and collaboration.

● Comments and examples:

- You'll regularly encounter situations — exams, evaluations, and more — where you must demonstrate real understanding. Be prepared, keep building both your technical and interpersonal skills.
- Explaining your reasoning and debating with peers often reveals gaps in your understanding. Make peer learning a priority.
- AI tools often lack your specific context and tend to provide generic responses. Your peers, who share your environment, can offer more relevant and accurate insights.
- Where AI tends to generate the most likely answer, your peers can provide alternative perspectives and valuable nuance. Rely on them as a quality checkpoint.

✓ Good practice:

> I ask AI: "How do I test a sorting function?" It gives me a few ideas. I try them out and review the results with a peer. We refine the approach together.

✗ Bad practice:

> I ask AI to write a whole function, copy-paste it into my project. During peer-evaluation, I can't explain what it does or why. I lose credibility — and I fail my project.

✓ Good practice:

> I use AI to help design a parser. Then I walk through the logic with a peer. We catch two bugs and rewrite it together — better, cleaner, and fully understood.

✗ Bad practice:

> I let Copilot generate my code for a key part of my project. It compiles, but I can't explain how it handles pipes. During the evaluation, I fail to justify and I fail my project.

Chapter V

Mandatory part

Program Name	so_long
Files to Submit	Makefile, *.h, *.c, maps, textures
Makefile	NAME, all, clean, fclean, re
Arguments	A map in format *.ber
External Function	• open, close, read, write, malloc, free, perror, strerror, exit • All functions of the math library (-lm compiler option, man man 3 math) • All functions of the MiniLibX • gettimeofday() • ft_printf and any equivalent YOU coded
Libft authorized	Yes
Description	You must create a basic 2D game in which a dolphin escapes Earth after eating some fish. Instead of a dolphin, fish, and the Earth, you can use any character, any collectible and any place you want.

Your project must comply with the following rules:

- You **must** use `MiniLibX`, using either the version on the school machines or by installing it using its sources.
- You have to turn in a `Makefile` which will compile your source files. It must not relink.
- Your program must take a map description file with the extension `.ber` as a parameter.

V.1 Game

- The player's goal is to collect all collectibles on the map and then escape by choosing the shortest possible route.
- The `W`, `A`, `S`, and `D` keys must be used to move the main character.
- The player should be able to move in these **four directions**: up, down, left, and right.
- The player should not be able to move into walls.
- At every move, the current **number of movements** must be displayed in the shell.
- You have to use a **2D view** (top-down or profile).
- The game does not have to be in real time.
- Although the given examples show a dolphin theme, you can create the world you want.

`If you prefer, you can use ZQSD or the arrow keys on your keyboard to move your main character.`

V.2 Graphic management

- Your program has to display the image in a window.
- Window management must remain smooth (switching to another window, minimizing, etc.).
- Pressing `ESC` must close the window and quit the program in a clean way.
- Clicking on the cross on the window's frame must close the window and quit the program in a clean way.
- The use of the `images` of the `MiniLibX` is mandatory.

V.3 Map

- The map has to be constructed with 3 components: **walls**, **collectibles**, and **free space**.
- The map can be composed of only these 5 characters:
  0 for an empty space,
  1 for a wall,
  C for a collectible,
  E for a map exit,
  P for the player's starting position.

  Here is a simple valid map:

```
1111111111111
10010000000C1
1000011111001
1P0011E000001
1111111111111
```

- To be valid, a map must contain **1 exit**, **1 starting position** and at least **1 collectible**.

If the map contains duplicate characters (exit/start), an error message should be displayed.

- The map must be rectangular.
- The map must be enclosed/surrounded by walls. If it is not, the program must return an error.
- You must verify if there is a valid path in the map.
- You must be able to parse any kind of map, as long as it respects the above rules.
- Another example of a minimal `.ber` map:

```
1111111111111111111111111111111111
1E0000000000000C00000C000000000001
1010010100100000101001000000010101
1010010010101010001001000000010101
1P0000000C00C0000000000000000000C1
1111111111111111111111111111111111
```

- If any misconfiguration is encountered in the file, the program must exit cleanly, and return "Error\n" followed by an explicit error message of your choice.

Chapter VI

Readme Requirements

A README.md file must be provided at the root of your Git repository. Its purpose is to allow anyone unfamiliar with the project (peers, staff, recruiters, etc.) to quickly understand what the project is about, how to run it, and where to find more information on the topic.
The README.md must include at least:

- The very first line must be italicized and read: *This project has been created as part of the 42 curriculum by <login1>[, <login2>[, <login3>[...]]].*
- A "**Description**" section that clearly presents the project, including its goal and a brief overview.
- An "**Instructions**" section containing any relevant information about compilation, installation, and/or execution.
- A "**Resources**" section listing classic references related to the topic (documentation, articles, tutorials, etc.), as well as a description of how AI was used — specifying for which tasks and which parts of the project.

➠ **Additional sections may be required depending on the project** (e.g., usage examples, feature list, technical choices, etc.).

Any required additions will be explicitly listed below.

English is recommended; alternatively, you may use the main language of your campus.

Chapter VII

Bonus part

Typically, you would be encouraged to develop your own original additional features; however, more interesting graphic projects await you in the future. Don't spend too much time on this assignment!

You are allowed to use other functions to complete the bonus part, provided their use is **justified** during your evaluation. Be smart!

You will receive extra points if you:

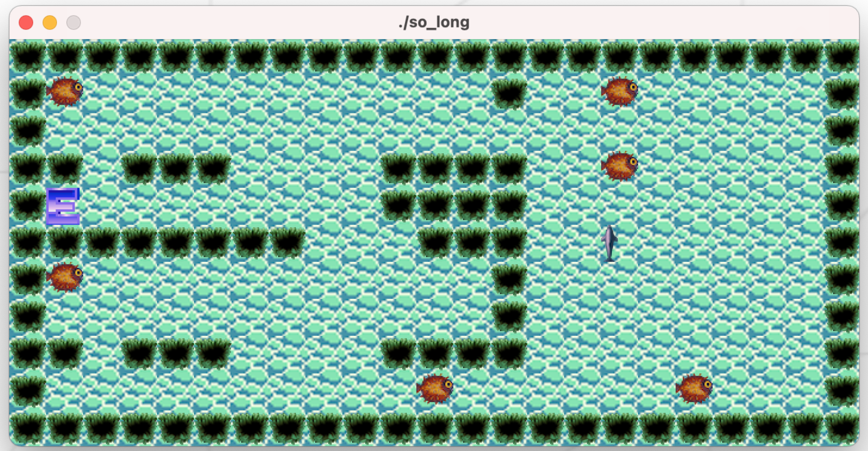
- Make the player lose when they touch an enemy patrol.
- Add some sprite animation.
- Display the movement count directly on screen instead of writing it in the shell.

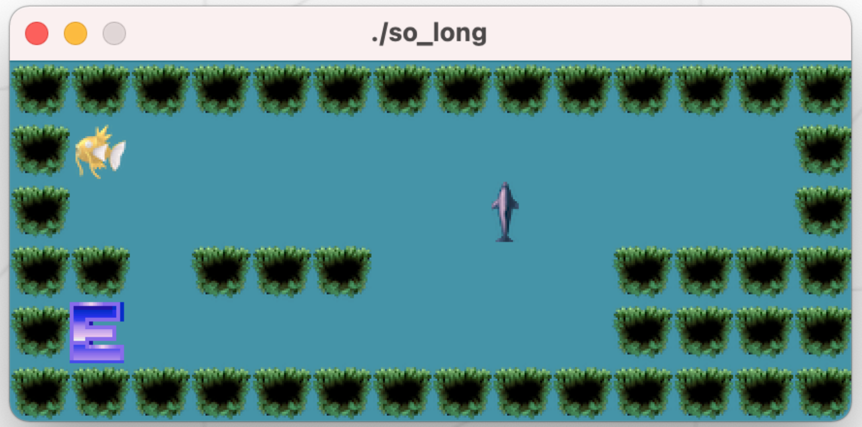
`You can add files/folders based on bonuses as needed.`

`The bonus part will only be assessed if the mandatory part is PERFECT. Perfect means the mandatory part has been integrally done and works without malfunctioning. If you have not passed ALL the mandatory requirements, your bonus part will not be evaluated at all.`

Chapter VIII

Examples





so_long examples showing terrible taste in graphic design
(almost worth some bonus points)!

Chapter IX

Submission and peer-evaluation

Submit your assignment in your `Git` repository as usual. Only the work inside your repository will be evaluated during the defense. Do not hesitate to double check the names of your files to ensure they are correct.

Since these assignments are not verified by a program, feel free to organize your files as you wish, provided you submit the mandatory files and comply with the requirements.

During the evaluation, a brief **modification of the project** may occasionally be requested. This could involve a minor behavior change, a few lines of code to write or rewrite, or an easy-to-add feature.

While this step may **not be applicable to every project**, you must be prepared for it if it is mentioned in the evaluation guidelines.

This step is meant to verify your actual understanding of a specific part of the project. The modification can be performed in any development environment you choose (e.g., your usual setup), and it should be feasible within a few minutes — unless a specific timeframe is defined as part of the evaluation.
You can, for example, be asked to make a small update to a function or script, modify a display, or adjust a data structure to store new information, etc.

The details (scope, target, etc.) will be specified in the **evaluation guidelines** and may vary from one evaluation to another for the same project.