**Software Design and Development Logbook**

A screenshot of a video game

Description automatically generated with medium confidence**Stage 1:**

This logbook is for the software design project: Sputnik-1

The game is suitable for all ages. There is no age limit. The expected audience is people from 10 years old. Designed for solo players.

This project is a game called Sputnik-1. The player starts as a spaceship that flies between asteroids. The whole point of a game is to avoid asteroids and reach maximum 5th level. Each asteroid in a collision will reduce HP of the ship. When HP gets to zero, the game is over.

Required programs are:

Visual Studio Code (version 1.59 and higher)

**Logbook:**

Date: June 1 2021

Time: 3 hours

I thought about what kind of project I was going to do. Knowing my skills, I do not think about something grandiose. This project should show all my skills. Since I've always wanted to program games, I decided to make a mini game. I hope I succeed.

Date: June 6 2021

Time: 1-2 hours

I got an idea for a game. Now I need to plan my work on it. If I work without interruption, I have about 3 months. 2 weeks of this is a vacation where I can work with double strength. I am sure that I will manage it during this time. Problems arose with the name of the game. To avoid plagiarism, I need to come up with something unique. I have too little imagination.

Date: June 11 2021

Time: 1 hour

After planning the project, I got to work. The name for the game has not yet been invented. First, I had to write the main loop of the game. This is the most boring part of the project. Luckily, I had a basic template. What a fine fellow I am that I do not delete old programs. I just had to adjust the speed of the game by setting the required number of FPS. Also, I need to add the required libraries. There were no problems at this stage since I had everything ready in advance. Next, I must make a game window.

Date: June 12-13 2021

Time: 1 hour

I have added the required libraries. But I ran into a problem. The “pygame” library didn't work. I tried 3 different ways to install it, but it still hasn't worked. The solution was simple - to stop and rest. The next day everything worked. Perhaps the solution to the problem was to restart the computer. I'm glad it worked out. Next, I made a game window. For the convenience of testing, I set the base colors. Next, I plan to make the movements of the player.

Date: June 15 2021

Time: 4 hours

Shape

Description automatically generatedI spent most of the time in this step making an infinite field. Entering one side of the screen, the player had to leave the opposite side. There was a problem: due to the wrong code, when the player left the screen, he disappeared without a trace. This problem was solved by correcting the code. I'm glad it worked out pretty quickly. But I don't like that the player looks like a "cube". Between the stages I need to add a player sprite.

Date: June 21 2021

Time: 10 hours

I added a player sprite. But it was taken from the Internet, so in the future I will replace it with my own.

This stage was many times more difficult than all the previous ones. I added the enemies "asteroids". I was very tired and needed a break of a couple of days. I investigated the "random" library. There were problems with setting random parameters. Asteroids now move at different speeds. At the moment, asteroids are harmless for the player. Plans to make a system of shooting and collisions. I am proud of my work.

Date: June 21 2021

Time: 4 hours

I made an asteroid and player collision system. Now, any asteroid can kill the player. I think it's too difficult. This will need to be fixed in the future.

To make the collisions more correct, I made the correct hitboxes.

A separate folder with sprites was made. The problem was to show the computer where this folder is. The "os" library helped me a lot. I also created a folder with sounds in advance.

Most of the time this stage took me to create the shooting. Problems with bullet size and hitboxes. There were also problems with the crash of the game after being hit by an asteroid. All bugs were fixed.

Next, I am planning to make the spacecraft HP.

Date: July 5 2021

Time: 5 hours

At this point, I add an HP of the spaceship. It was simple enough and there were no problems. But the gameplay was boring, the player lacked complexity. To fix this, I decided to add difficulty levels. Because of them, the game found its goal. It was also decided to show the player how many asteroids he shot down so that he could compete with someone.

Not without a couple of errors in the code. I constantly forget to indicate from which library a particular command is taken. Everything was solved with the help of the Internet and various forums, where they willingly helped me. It's good that there are such kind people.

To make the game more enjoyable, I plan to add music and sounds to the game.

Date: July 8 2021

Time: 3 hours

Following a guide from the internet, I added music and gunfire sounds. There were problems with the type of music files, but changing them, everything worked out. The stage was boring enough. But after this stage, the game changed. It now looks more like a full-fledged mini game. I am very happy about it.

The copied sprites make the game feel less unique. Next, I plan to draw sprites.

Date: July 11 2021

Time: 3 hours

I haven't started working with sprites yet.

I enjoyed my game for a long time. I tested all possible actions. No bugs were found. This makes me happy.

I will be making sprites soon.

Date: July 11 2021

Time: 1 hour

No sprites have been drawn yet. I'm a bad artist. I had to ask a friend for help, and she drew me the background of the game. The game becomes more beautiful.

I am facing the most important problem of the project - the name of the game. I need to come up with it as soon as possible.

Date: July 15 2021

Time: 3 hours

I added the HP and spaceship sprites. Also made the animation of the loss. I really like it, so I often lose. Then all that remains is to test the game and identify subtle bugs. I finally came up with a name for the game!

**Stage 2:**

Flowchart:

**Diagram

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Structure chart:Diagram

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**Stage 3:**

[See Game1.py file]

**Stage 4:**

**User manual:**

**System requirements:** x32 or x64 operating system.  
16mb RAM

8.0 mb Hardrive Space

Pentium processor at 90MHz or higher

Visual Studio Code and external files v1.59 or superior

Windows 7,8,10

**Installation guide:**

Installation guide: With the files received, open Visual Studio Code with whichever version you have installed and go to ‘File’ at the top-left of the VScode screen and click ‘Open Folder...’ or press CTRL + O or CTRL + T. Locate the Sputnik-1 folder, click it and click 'Open'. Press CTRL+` to open terminal and then enter 'python game1.py' to the console line, then press ‘Enter’ button.

**Instructions for use of the program**

Start the game on your computer.

Everything is keyboard based.

You only need to use the arrow keys and the space bar.

Goal of the game: to reach the 5th level. How to reach it, described in the tutorial.

**Tutorial:**

When you start the program, the game will start immediately. The main goal of the game is to get to the 5th level. Then the game will be endless.

You start out as a spaceship at the bottom of the field. Use the **arrow keys** to navigate the field. Asteroids fly from above at different speeds and trajectories. Your task is to shoot them by releasing bullets by **pressing the space bar**. If a bullet hits an asteroid, it will explode and disappear, and you will be awarded 1 point. The received points and the level of the game can be seen at the top center of the screen. The longer you shoot down asteroids, the more difficult the game becomes. The level of the game rises for every shot down 20 asteroids, up to the 5th level. At each level, asteroids start flying faster. Carefully! If an asteroid hit a spaceship, it will lose a certain amount of HP. Initially, the spaceship has 50 HP. The amount of HP can be seen in the upper left corner of the screen. If the HP level drops to 0, the game will end.

**Screens:**

Game window:

**A screenshot of a phone

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Asteroid hit:

**A screenshot of a video game

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Spaceship hit:

A screenshot of a video game

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Game over:

Graphical user interface

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**Troubleshooting:**

1. If the game won't start, restart your computer.
2. If that doesn't fix the problem, reinstall the executable or update the python compiler.
3. If an error occurs: player\_img = pygame.image.load(os.path.join(

FileNotFoundError: No such file or directory.

Check the integrity of the texture folder. Or reinstall it.

1. If the game doesn't work, please contact support service – rodion.korshunov.04@mail.ru