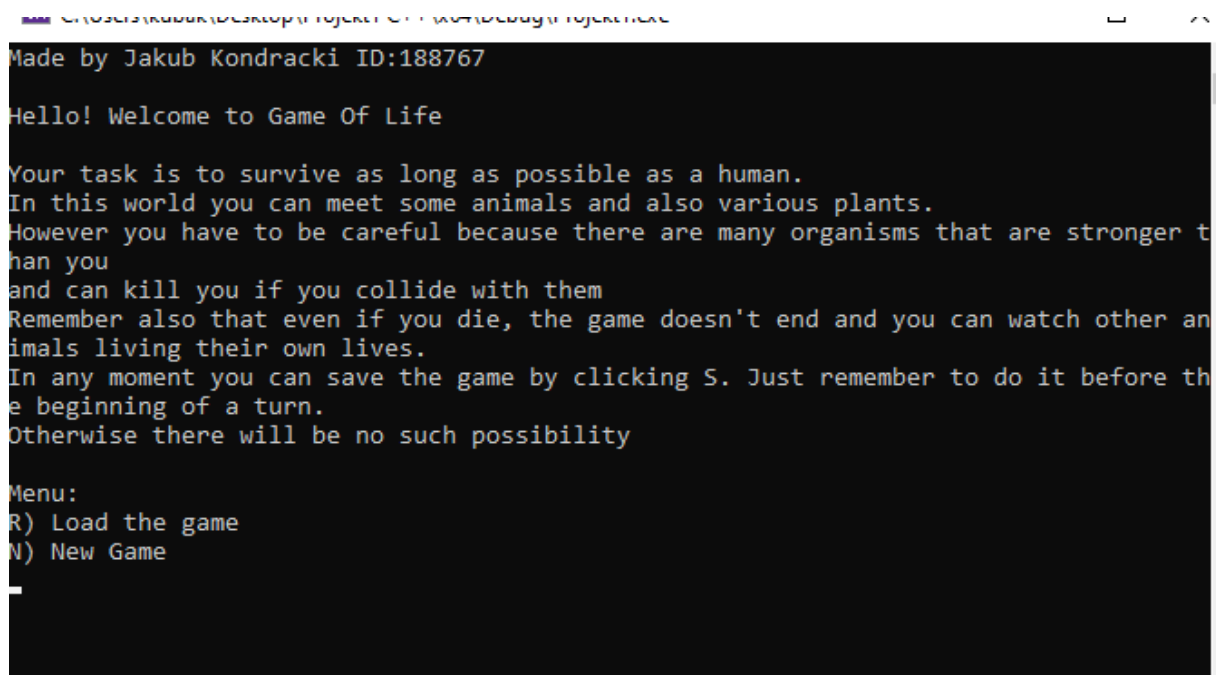


## Project 1 – C++ - Jakub Kondracki ID:188767

Our task was to implement a 2D world and make its visualization. I've made the requirements which are needed for 5 points. I've implemented:

- The whole world and its visualization.
- 5 Animal classes with breeding – Antelope, Fox, Wolf, Turtle and Sheep
- 5 Plant classes with sawing – Guarana, Sosnowsky's hogweed, Grass, Belladonna and sow thistle
- A human (player) which is moving by clicking the arrow keys.
- A human's special ability – in my case it is Immortality
- Saving and loading state of the world to file and from file.

When we click start a window appears on which my name, second name and index appears. Then we can see small introduction to the game which in short presents what is the point of the game. And in the end we can see a menu with 2 options. Loading a game with clicking 'R' button and creating a new game by clicking 'N' button. After clicking 'N' your job is to write the size of the board. For example if you want a board 20x20 then you need to write "20 20".



```

C:\Users\Jakub\Desktop\Project 1\GameOfLife\GameOfLife.exe
Made by Jakub Kondracki ID:188767

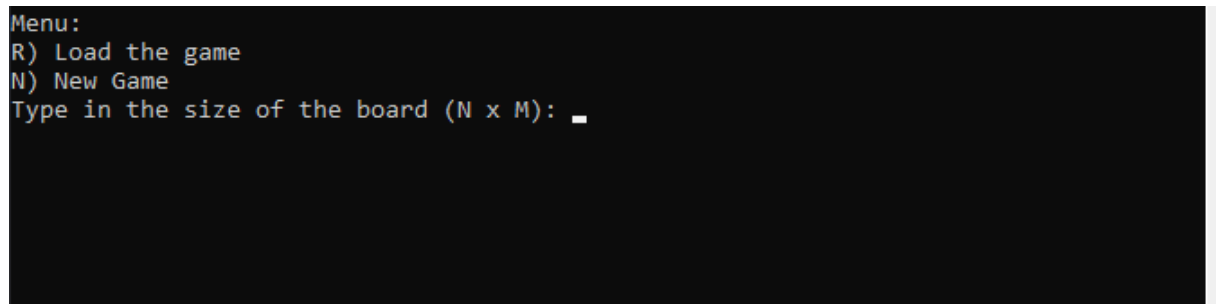
Hello! Welcome to Game Of Life

Your task is to survive as long as possible as a human.
In this world you can meet some animals and also various plants.
However you have to be careful because there are many organisms that are stronger than you
and can kill you if you collide with them
Remember also that even if you die, the game doesn't end and you can watch other animals living their own lives.
In any moment you can save the game by clicking S. Just remember to do it before the beginning of a turn.
Otherwise there will be no such possibility

Menu:
R) Load the game
N) New Game

```

After clicking new game:



```

Menu:
R) Load the game
N) New Game
Type in the size of the board (N x M): 

```

And here's the implementation of this menu in C++:

```
1  #include <iostream>
2  #include <conio.h>
3  #include <string>
4  #include <time.h>
5  #include "Generator.h"
6  #include "World.h"
7
8  #define InsertKey 224
9  #define ENTER 13
10 #define SAVE 115
11 #define READ 114
12 #define NEW 110
13 #define AllSpecies 10
14 #define FreeSpace 20 //na 10 zwierzat - po jednym z kazdego gatunku
15
16 using namespace std;
17
18 int main()
19 {
20     srand(time(NULL));
21     int n, m;
22     char choice1 = NULL;
23     char choice2 = NULL;
24     bool loaded = true;
25
26     cout << "Made by Jakub Kondracki ID:188767" << endl << endl;
27
28     cout << "Hello! Welcome to Game Of Life" << endl << endl;
29     cout << "Your task is to survive as long as possible as a human." << endl;
30     cout << "In this world you can meet some animals and also various plants." << endl;
31     cout << "However you have to be careful because there are many organisms that are stronger than you " << endl << "and can kill you if you collide with them" << endl;
32     cout << "Remember also that even if you die, the game doesn't end and you can watch other animals living their own lives." << endl;
33     cout << "In any moment you can save the game by clicking S. Just remember to do it before the beginning of a turn." << endl;
34     cout << "Otherwise there will be no such possibility" << endl << endl;
35
36     cout << "Menu:" << endl;
37     cout << "(R) Load the game" << endl;
38     cout << "(N) New Game" << endl;
39
40     World* world = nullptr;
41     Generator* generator = nullptr;
42
43     do
44     {
45         loaded = true;
46         choice1 = _getch();
47         switch (choice1)
48         {
49             case READ:
50                 world = new World();
51                 generator = new Generator(world);
52                 if (!generator->LoadWorld())
53                 {
54                     cout << "Please try again" << endl;
55                     loaded = false;
56                 }
57                 break;
58             case NEW:
59                 do
60                 {
61                     cout << "Type in the size of the board (N x M): ";
62                     cin >> n >> m;
63                     system("cls");
64                 } while (n * m < (AllSpecies + FreeSpace));
65
66                 world = new World(n, m);
67                 generator = new Generator(world);
68                 generator->GenerateWorld();
69                 break;
70             default:
71                 cout << "Wrong key, please try again" << endl;
72         }
73     } while ((choice1 != READ || !loaded) && choice1 != NEW);
74
75     system("cls");
76     world->DrawWorld();
```

When you type in the size of the board then you are moved to your unique 2D world which contains:

- Information about author.
- Information about the turn of the game.
- Option to create a new game
- Option to save a world to a file
- Visualization of the world
- Information about all events which happened in this turn.

To make a turn player has to press ENTER button. After clicking it, on the bottom of the screen we can see a instruction how to turn on immortality (which lasts for 5 rounds) and also how to move a human.

Every animal has a different index:

Human: 'X'	Grass: 'g'
Fox: 'F'	Sow Thistle: 'm'
Antelope: 'A'	Belladonna: 'b'
Wolf: 'W'	Sosnowsky's hogweed: 's'
Turtle: 'T'	Guarana: 'G'
Sheep: 'S'	

Here is an example on the 10x10 world:

Zero turn (creating a world):

```
C:\Users\Kubak\Desktop\Projekt\C++\x04\Debug\Projekt.exe
Made by Jakub Kondracki ID:188767

Turn: 0

N) New game
S) Save progress
To start a turn press ENTER

%%F T S%
% GT A %
% s W b%
% FA GF Ab%
% g s %
% Sb X %
% mWG W %
% m g %
% gT ms %
% S %
%%F T S%

Human: creating new organism (5, 6)
Wolf: creating new organism (3, 7)
Sheep: creating new organism (2, 6)
Fox: creating new organism (2, 4)
Turtle: creating new organism (4, 2)
Antelope: creating new organism (3, 4)
Grass: creating new organism (4, 9)
Sow Thistle: creating new organism (2, 7)
Guarana: creating new organism (4, 7)
Belladonna: creating new organism (10, 3)
Sosnowsky hogweed: creating new organism (8, 9)
Wolf: creating new organism (9, 7)
Sheep: creating new organism (1, 10)
Fox: creating new organism (7, 4)
Turtle: creating new organism (5, 9)
Antelope: creating new organism (9, 2)
Grass: creating new organism (2, 5)
Sow Thistle: creating new organism (7, 9)
Guarana: creating new organism (3, 2)
Belladonna: creating new organism (10, 4)
Sosnowsky hogweed: creating new organism (7, 5)
Wolf: creating new organism (7, 3)
Sheep: creating new organism (10, 1)
Fox: creating new organism (1, 1)
Turtle: creating new organism (3, 1)
```

Clicking ENTER:

```
C:\Users\KUBAK\Desktop\PROJECT C++\X04\Debug\PROJECT1.exe
Human:  creating new organism (5, 6)
Wolf:   creating new organism (3, 7)
Sheep:  creating new organism (2, 6)
Fox:    creating new organism (2, 4)
Turtle: creating new organism (4, 2)
Antelope: creating new organism (3, 4)
Grass:  creating new organism (4, 9)
Sow Thistle: creating new organism (2, 7)
Guarana: creating new organism (4, 7)
Belladonna: creating new organism (10, 3)
Sosnowsky hogweed: creating new organism (8, 9)
Wolf:    creating new organism (9, 7)
Sheep:   creating new organism (1, 10)
Fox:     creating new organism (7, 4)
Turtle:  creating new organism (5, 9)
Antelope: creating new organism (9, 2)
Grass:   creating new organism (2, 5)
Sow Thistle: creating new organism (7, 9)
Guarana: creating new organism (3, 2)
Belladonna: creating new organism (10, 4)
Sosnowsky hogweed: creating new organism (7, 5)
Wolf:    creating new organism (7, 3)
Sheep:   creating new organism (10, 1)
Fox:     creating new organism (1, 1)
Turtle:  creating new organism (3, 1)
Antelope: creating new organism (9, 4)
Grass:   creating new organism (3, 8)
Sow Thistle: creating new organism (1, 8)
Guarana: creating new organism (6, 4)
Belladonna: creating new organism (3, 6)
Sosnowsky hogweed: creating new organism (1, 3)

To activate Immortality press I
Move your character by one of the arrow keys (You are 'X')
_
```

When you turn on immortality, a message will show up, confirming that our ability is activated.

```
Belladonna:  sawing the plant from (10, 7) na pole (10, 6)

To activate Immortality press I
Move your character by one of the arrow keys (You are 'X')
Immortality activated
```

C:\Users\kubak\Desktop\Projekt1\C++\x64\Debug\Projekt1.exe

Turn: 1

S) Save progress

%%%%%%%%%

% A A 5%

% g F b%

	g	W
% b		

[illegible]

% 5 %

0/0/0/0/0/0/0/0/0/0

```
Fox: moving from (7, 4) to (6, 4)
```

Guarana: enhancement of Fox by 3 points

Fox: moving from (1, 1) to (1, 2)

Wolf: attacked Grass

Wolf: moving from (9, 7) to (9, 6)

Human: moving from (5, 6) to (5, 7)

Sheep: attacked Sow Thistle

```
Antelope:      moving from (3, 4) to (3, 2)
```

Guarana: enhancement of Antelope by 3 points

```
Sheep: moving from (1, 10) to (2, 10)
```

```
Sheep:  moving from (10, 1) to (10, 2)
```

```
Turtle:      moving from (4, 2) to (4, 3)
```

\_\_\_\_\_

As we can see, world has changed because animals have moved to another positions and some of the plants died because of consumption by animals.

And sawing happens with a certain probability:

- For grass it is 50% that sawing will success (It is easy to saw)
- For guarana it is 20% chance of success
- For Sosnowsky's hogweed it is 15% chance
- For belladonna it is 20% chance
- For sow thistle it is 30% chance, but it has 3 chances to spread in each turn

- For grass it is 50% that sawing will success (It is easy to saw)
- For guarana it is 20% chance of success
- For Sosnowsky's hogweed it is 15% chance
- For belladonna it is 20% chance
- For sow thistle it is 30% chance, but it has 3 chances to spread in each turn



```
Made by Jakub Kondracki ID:188767

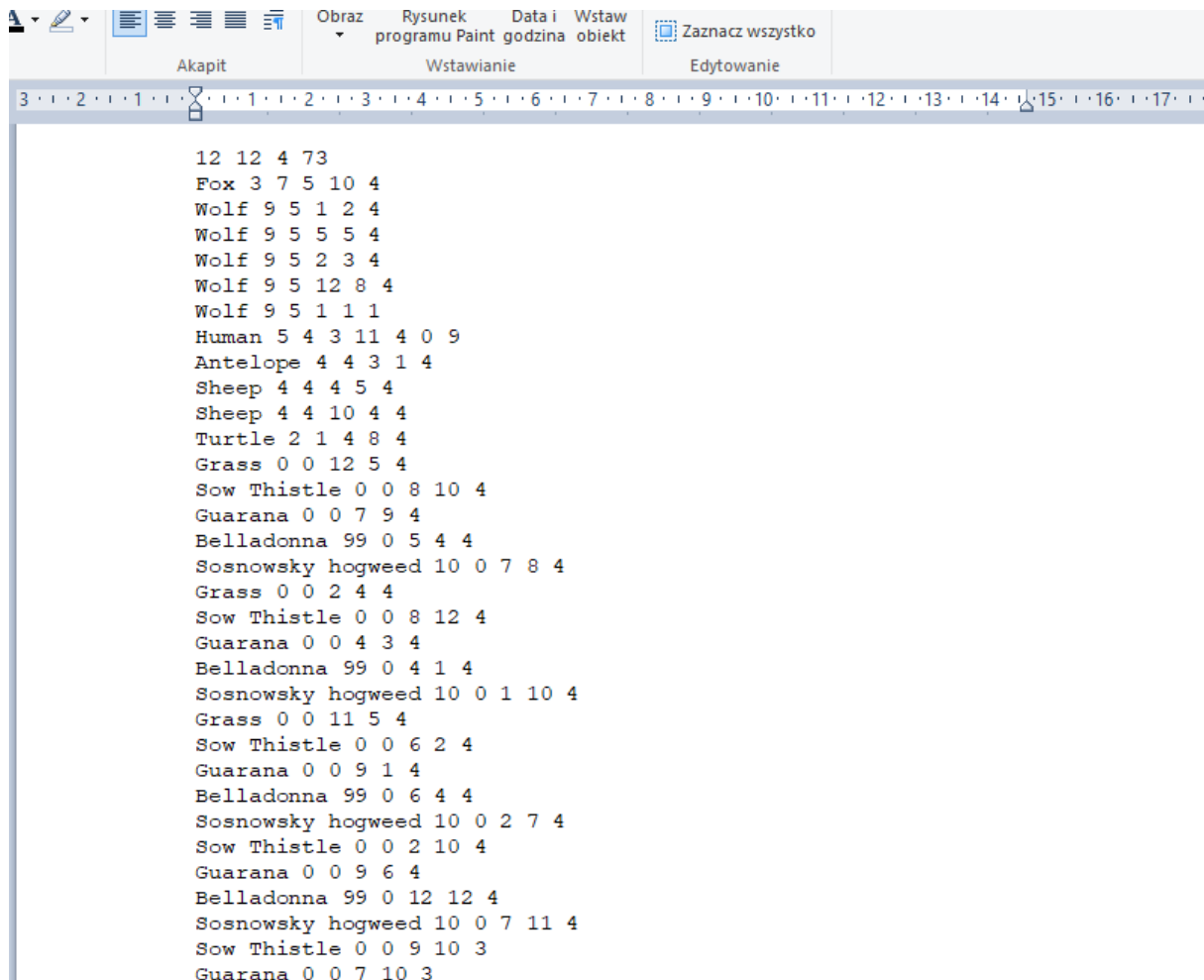
Turn: 4

N) New game
S) Save progress
to start a turn press ENTER

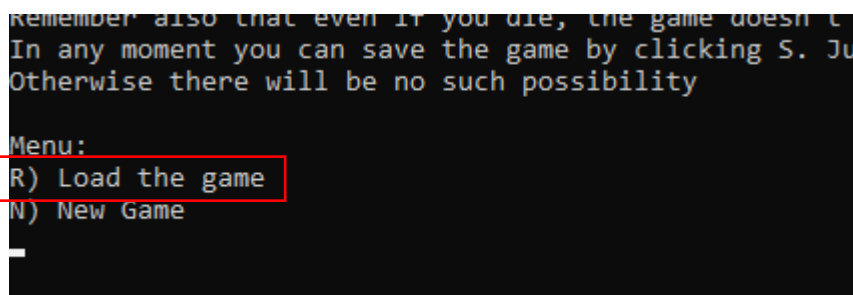
%%%%%%%%%%%%%
%W Ab mmGGG %
%W bmmmmG g%
%gW G m gg%
%gg bbb Sgg%
%gggSW gg%
% g GG g %
% s %
% T s W%
% m Gmm %
%smmmF Gmmm %
% X s mmb%
% mmmmmmb%
%%%%%%%%%%%%%

Fox: moving from (5, 9) to (5, 10)
Fox: moving from (9, 8) to (8, 8)
Fox: moving from (12, 7) to (12, 8)
Wolf: moving from (1, 2) to (1, 3)
Wolf: attacked Wolf
Wolf: creating new organism (1, 1)
Organism reproduced
```

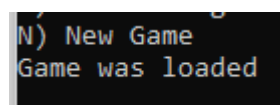
Our progress of the game is saved in the file which is called "dane.txt":



And we can load it by clicking “Load the game” on the first screen:



Loading the game:





And the result:

```
Turn: 4

N) New game
S) Save progress
To start a turn press ENTER

/////////////////////////////////
%W Ab mmGGG %
%W bmmmmG g%
%gW G m gg%
%gg bbb Sgg%
%gggSW gg%
% g GG g %
% s %
% T s W%
% m Gmm %
%smmmF Gmmm %
% X s mmb%
% mmmmmmb%
/////////////////////////////////

Fox: creating new organism (5, 10)
Wolf: creating new organism (1, 2)
Wolf: creating new organism (5, 5)
Wolf: creating new organism (2, 3)
Wolf: creating new organism (12, 8)
Wolf: creating new organism (1, 1)
Human: creating new organism (3, 11)
Antelope: creating new organism (3, 1)
```