



SLIDING PUZZLE

Team Name - Mercury

Presentation by

Murali Ram Ravipati

Ayantan Dandapat

Srinivas Narne

PROBLEM STATEMENT

- The "Fifteen puzzles (more generally called the Sliding Puzzle) is a simple classic game consisting of a 4x4 grid of numbered squares with one square missing. The object of the game is to arrange the tiles into numerical order by repeatedly sliding a square that neighbors the missing square into its empty space.
- When the mouse button is pressed on a puzzle square, it is moved into the blank space if that square is next to the blank square. If the square does not neighbor the blank square, no action occurs. Similarly, no action occurs if the mouse is pressed on the empty square or elsewhere on the page.
- When the Shuffle button is clicked, the tiles of the puzzle are randomized. The tiles must be rearranged into a solvable state. The goal of the fifteen puzzle is to un-jumble its fifteen squares by repeatedly making moves that slide squares into the empty space. How quickly can you solve it?

Scrum

What is Scrum?

- *Scrum is a Framework that helps the people ,teams and organizations generate value through adaptive solutions for complex problems.*
- *It's framework of rules, roles, events and artifacts used to implement Agile projects. It is an iterative approach, consisting of sprints that typically only last one to four weeks.*

Scrum Events

- All events are time-boxed.
- Once a Sprint begins, its duration is fixed and cannot be shortened or lengthened.
- Scrum Events are:
 - Sprint
 - Sprint Planning
 - Daily Scrum
 - Sprint Review
 - Sprint Retrospective

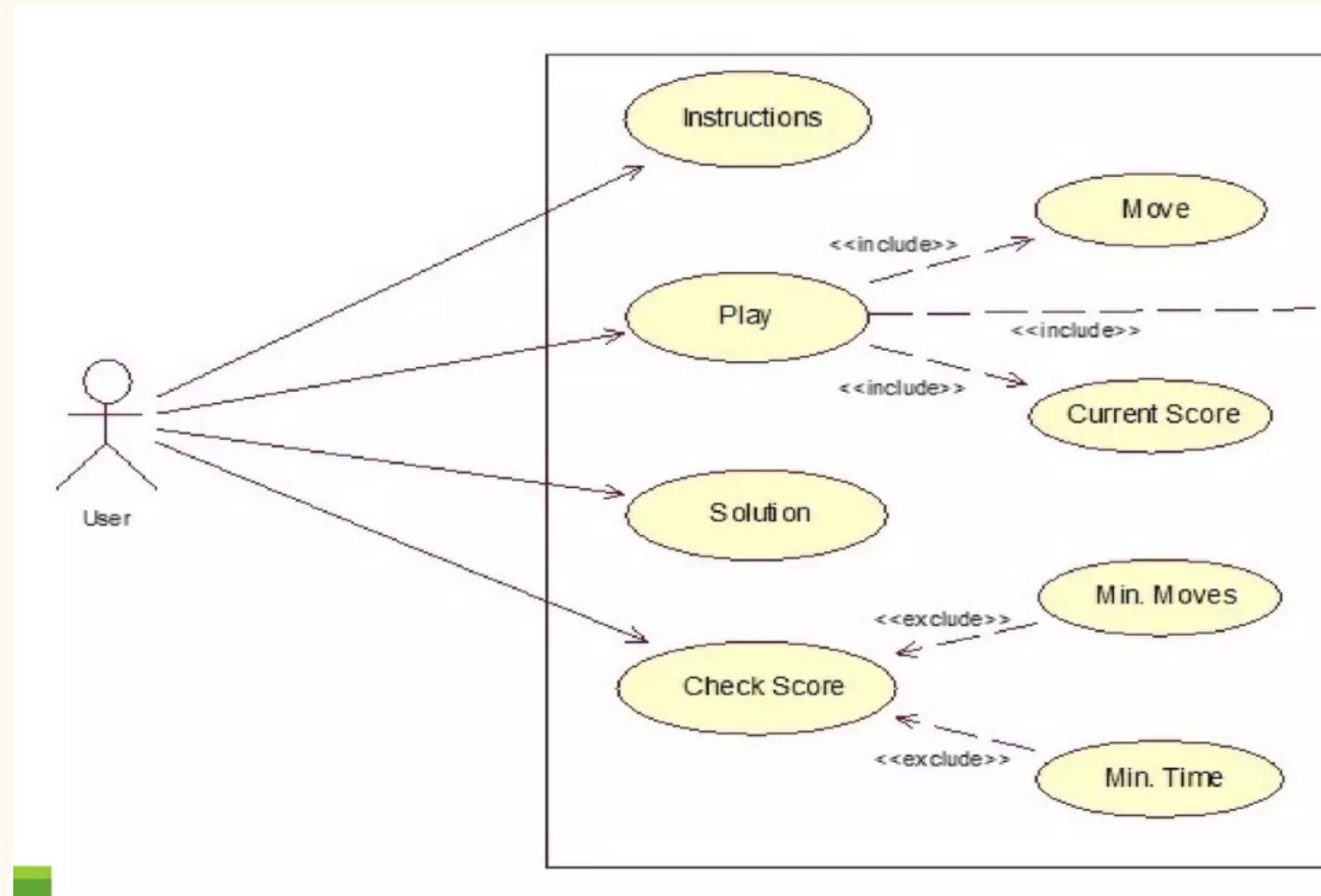
Benefits of Scrum

1. Quicker release of the useable product to users and customers
2. Higher quality
3. Higher Productivity
4. Lower costs.
5. Greater ability to incorporate changes as they occur
6. Better user satisfaction

WHY SCRUM WORKS

- With scrum, work is done by the development team simultaneously rather than sequentially. Programmers code on the fly and do not wait until all questions are answered, and everything is crystal clear before they start to program.
- With scrum, there is adaptability. Changes can be supported and integrated into a project currently in progress.
- With Scrum, tasks are prioritized by order of importance and this usually means that tasks to be completed first will probably affect the return on investment the most.

UML DIAGRAM



Extra Features

- ***End-of-game notification***
- ***Animations and/or transitions***
- ***Game time with some music file***
- ***Multiple backgrounds***
- ***Extra Animation***
- ***Reset button(Additional Feature of our choice)***

Fifteen Puzzle

The goal of the fifteen puzzle is to un-jumble its fifteen squares by repeatedly making moves that slide squares into the empty space. How quickly can you solve it?

Total Moves: 0

Clock: Will Start after you hit shuffle

Charizard

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	

Reset Puzzle

Shuffle

American puzzle author and mathematician Sam Loyd is often falsely credited with creating the puzzle; indeed, Loyd claimed from 1891 until his death in 1911 that he invented it. The puzzle was actually created around 1874 by Noyes Palmer Chapman, a postmaster in Canastota, New York.

Fifteen Puzzle

The goal of the fifteen puzzle is to un-jumble its fifteen squares by repeatedly making moves that slide squares into the empty space. How quickly can you solve it?

Total Moves: 0

Clock: Will Start after you hit shuffle

Pikachu

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	

Reset Puzzle

Shuffle

American puzzle author and mathematician Sam Loyd is often falsely credited with creating the puzzle; indeed, Loyd claimed from 1891 until his death in 1911 that he invented it. The puzzle was actually created around 1874 by Noyes Palmer Chapman, a postmaster in Canastota, New York.

Fifteen Puzzle

The goal of the fifteen puzzle is to un-jumble its fifteen squares by repeatedly making moves that slide squares into the empty space. How quickly can you solve it?

Total Moves: 0

Clock: Will Start after you hit shuffle

Mario

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	

Reset Puzzle

Shuffle

American puzzle author and mathematician Sam Loyd is often falsely credited with creating the puzzle; indeed, Loyd claimed from 1891 until his death in 1911 that he invented it. The puzzle was actually created around 1874 by Noyes Palmer Chapman, a postmaster in Canastota, New York.

Functions Used

```
function checkIfWon() {
    if (ids.toString() == shuffled.toString()) { // Test the image, time and number of turns by swapping ==
        shuffle_flag = 0;

        var end      = new Date();
        var elapsed_ms = end - start;
        var seconds   = Math.round(elapsed_ms / 1000);

        var winHtml = "<br>";
        winHtml += "<img src='win.gif' alt='You win' />";
        winHtml += "<p>Total time it took you to solve this puzzle (in seconds): " + seconds + "</p>";
        winHtml += "<p>Total number of moves it took you to solve this puzzle: " + moves + "</p>";

        document.getElementById("win").innerHTML = winHtml;
        clearInterval(displaySeconds);
        document.getElementById("clock").innerHTML = "<br><br>Clock: " + seconds + "s";
        document.getElementById("reset").disabled = false;
        document.getElementById("shuffle").disabled = false;

        audio.pause();
        audio.currentTime = 0;
        var winAudio = new Audio("winAudio.mp3");
        winAudio.play();
        displayCelebration();
    }
}
```

```
function shuffleBoard() {
    // stop older instance of audio
    audio.loop = true;
    audio.play();
    shuffle_flag = 1;
    shuffled = ids.slice(); // Reinitialize the shuffled array
    var sixteen = 15;
    moves = 0;
    document.getElementById("win").innerHTML = "";
    document.getElementById("moves").innerHTML = "Total Moves: " + moves;
    document.getElementById("confetti-wrapper").innerHTML = "";
    document.getElementById("characters").disabled = true;
    document.getElementById("shuffle").disabled = true;
    document.getElementById("reset").disabled = false;
    start = new Date();

    displaySeconds = setInterval(function() {
        var now = new Date();
        var distance = now - start;
        seconds_elapsed = Math.round(distance / 1000);
        document.getElementById("clock").innerHTML = "<br><br>Clock: " + seconds_elapsed + "s";
    }, 1000);

    // Set a loop to go through 500 times
    for (var i = 0; i < 500; i++) {

        var movement_id = Math.floor((Math.random() * 4));

        while(movement[sixteen][movement_id] != 1) {
            movement_id = Math.floor((Math.random() * 4));
        }

        // The index id where the blank space will go to
        var move_to;

        switch(movement_id) {
            case 0:
                move_to = sixteen - 4;
                break;
                // subtract 4 to go to the top
            case 1:
                move_to = sixteen + 1;
                break;
                // add 1 to go to the right
            case 2:
                move_to = sixteen + 4;
                break;
                // subtract 4 to go to the bottom
            case 3:
                move_to = sixteen - 1;
                break;
                // subtract 1 to go to the left
        }
    }
}
```

```
function displayBoard() {  
    document.getElementById("main").innerHTML = "";  
  
    for (var i = 0; i < shuffled.length; i++) {  
        if (shuffled[i] == "") {  
            document.getElementById("main").innerHTML += '<div id="sixteen" class="tile"></div>';  
        } else {  
            var id_name = shuffled[i];  
            document.getElementById("main").innerHTML += '<div id=' + shuffled[i] + " class='tile' " + selected_background + "'>' + ids_numeric[id_name] + '</div>';  
        }  
    }  
  
    var clickable_id;  
  
    if (movement[shuffled.indexOf("")][0] == 1) {  
        clickable_id = shuffled.indexOf("") - 4;  
        document.getElementById(shuffled[clickable_id]).className += " clickable";  
        document.getElementById(shuffled[clickable_id]).setAttribute("onclick", "swapPieces(" + clickable_id + ", " + shuffled.indexOf("") + ")");  
    }  
  
    if (movement[shuffled.indexOf("")][1] == 1) {  
        clickable_id = shuffled.indexOf("") + 1;  
        document.getElementById(shuffled[clickable_id]).className += " clickable";  
        document.getElementById(shuffled[clickable_id]).setAttribute("onclick", "swapPieces(" + clickable_id + ", " + shuffled.indexOf("") + ")");  
    }  
  
    if (movement[shuffled.indexOf("")][2] == 1) {  
        clickable_id = shuffled.indexOf("") + 4;  
        document.getElementById(shuffled[clickable_id]).className += " clickable";  
        document.getElementById(shuffled[clickable_id]).setAttribute("onclick", "swapPieces(" + clickable_id + ", " + shuffled.indexOf("") + ")");  
    }  
  
    if (movement[shuffled.indexOf("")][3] == 1) {  
        clickable_id = shuffled.indexOf("") - 1;  
        document.getElementById(shuffled[clickable_id]).className += " clickable";  
        document.getElementById(shuffled[clickable_id]).setAttribute("onclick", "swapPieces(" + clickable_id + ", " + shuffled.indexOf("") + ")");  
    }  
}
```

```
function animateMovement(clickable_id, empty_id) {
    if (clickable_id - 4 == empty_id) {
        console.log(shuffled[clickable_id]);
        document.getElementById(shuffled[clickable_id]).className += " animate-up";
    } else if (clickable_id + 1 == empty_id) {
        document.getElementById(shuffled[clickable_id]).className += " animate-right";
    } else if (clickable_id + 4 == empty_id) {
        document.getElementById(shuffled[clickable_id]).className += " animate-down";
    } else if (clickable_id - 1 == empty_id) {
        document.getElementById(shuffled[clickable_id]).className += " animate-left";
    }
}
```

```
function resetPuzzle() {
    var background_id = Math.floor((Math.random() * 7));
    selected_background = background[background_id];
    console.log(selected_background);

    document.getElementById(background[background_id]).selected = true; // Grab the selected option and mark it as selected

    document.getElementById("main").innerHTML = "";

    for (var i = 0; i < ids.length; i++) {
        if (ids[i] == "") {
            document.getElementById("main").innerHTML += '<div id="sixteen" class="tile"></div>';
        } else {
            var id_name = ids[i];
            document.getElementById("main").innerHTML += '<div id="' + ids[i] + '" class="tile' + " " + selected_background + '">' + ids_numeric[id_name] + '</div>';
        }
    }

    clearInterval(displaySeconds);
    document.getElementById("moves").innerHTML = "Total Moves: 0";
    document.getElementById("clock").innerHTML = "<br><br>Clock: Will Start after you hit shuffles";
    document.getElementById("characters").disabled = false;
    document.getElementById("win").innerHTML = "";
    document.getElementById("confetti-wrapper").innerHTML = "";
    document.getElementById("shuffle").disabled = false;
    document.getElementById("reset").disabled = true;
}
```

```
function swapPieces(clickable_id, empty_id) {
    animateMovement(clickable_id, empty_id);

    setTimeout(function() {
        var temp = shuffled[empty_id];
        shuffled[empty_id] = shuffled[clickable_id];
        shuffled[clickable_id] = temp;

        moves++;
        document.getElementById("moves").innerHTML = "Total Moves: " + moves;

        displayBoard();
        checkIfWon();
    }, 600);
}
```

CSS Animation (Background)

```
body {
    background: #63B7B7;
    font-family: 'Lato', sans-serif;
    color: #FDFCFB;
    text-align: center;
    background-image: linear-gradient(45deg, #845ec2, #ff6f91, #f9f871, #ececbc, #65b9b9);
    background-size: 400% 400%;
    animation: bg-animation 20s infinite;
}

.title{
    font-family: Cursive;
    color: limegreen;
}

@keyframes bg-animation {
    0% {
        background-position: 0 0;
    }
    50% {
        background-position: 100% 0;
    }
    100% {
        background-position: 0 0;
    }
}
```

```
.move-up {  
    -webkit-transform: translate(0, -100px);  
    -moz-transform: translate(0, -100px);  
    -ms-transform: translate(0, -100px);  
    -o-transform: translate(0, -100px);  
    transform: translate(0, -100px);  
}  
  
.move-down {  
    -webkit-transform: translate(0, 100px);  
    -moz-transform: translate(0, 100px);  
    -ms-transform: translate(0, 100px);  
    -o-transform: translate(0, 100px);  
    transform: translate(0, 100px);  
}  
  
.move-left {  
    -webkit-transform: translate(-100px, 0);  
    -moz-transform: translate(-100px, 0);  
    -ms-transform: translate(-100px, 0);  
    -o-transform: translate(-100px, 0);  
    transform: translate(-100px, 0);  
}  
  
.move-right {  
    -webkit-transform: translate(100px, 0);  
    -moz-transform: translate(100px, 0);  
    -ms-transform: translate(100px, 0);  
    -o-transform: translate(100px, 0);  
    transform: translate(100px, 0);  
}
```

```
@keyframes confettiRain {  
    0% {  
        opacity: 1;  
        margin-top: -100vh;  
        margin-left: -200px;  
    }  
  
    100% {  
        opacity: 1;  
        margin-top: 100vh;  
        margin-left: 200px;  
    }  
}  
  
.confetti {  
    opacity: 0;  
    position: absolute;  
    width: 1rem;  
    height: 1.5rem;  
    transition: 500ms ease;  
    animation: confettiRain 5s infinite;  
}  
  
#confetti-wrapper {  
    overflow: hidden !important;  
}
```

Testing

- Safari
- Chrome
- Firefox