MATLAB Project Report

on

"MEMORY PUZZLE GAME USING MATLAB APP DESIGNER"

By

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ABSTRACT

This project presents the design and implementation of a **Memory Puzzle Game** using MATLAB App Designer, developed to enhance cognitive skills such as memory and concentration while demonstrating the versatility of MATLAB in interactive application development. The game is built around a 4x4 grid containing 16 cards arranged in pairs, where players are challenged to match all pairs within a limited time. At the start, the cards are briefly revealed for memorization and then hidden, after which players take turns flipping two cards per move. Correct matches increase the score while mismatches reduce it, making the game both engaging and competitive. A countdown timer is integrated to add urgency, and the game includes options to restart or give up, offering flexibility in play. The application combines GUI elements such as buttons, labels, and message prompts with programming concepts like randomization, conditional logic, and timer functions to deliver a dynamic experience. The scoring mechanism ensures balanced difficulty, while the use of MATLAB App Designer highlights how simple games can be employed as educational tools to learn GUI design and logical structuring. The project successfully demonstrates that MATLAB, traditionally used for engineering simulations, can also be applied in the design of interactive games. Future improvements may include larger grids, adjustable difficulty levels, customizable themes, and leaderboards to enhance competitiveness. Overall, the project provides both an enjoyable gaming experience and a practical example of GUI-based application development in MATLAB.

CONTENTS

I. INTRODUCTION

Project Overview

The Memory Puzzle Game is an interactive application developed using **MATLAB App Designer** with the objective of matching hidden pairs of cards in a limited time. The interface consists of a **4x4 grid of 16 cards**, a **scoreboard**, a **countdown timer**, and control buttons such as Start, Restart, and Give Up. Players flip two cards at a time; correct matches increase the score, while mismatches reduce it. The game ends either when all pairs are matched, time runs out, or the player chooses to stop. This project demonstrates MATLAB's ability to design not only engineering tools but also **interactive educational games**.

Background and Motivation

Memory-based games are well known for enhancing **cognitive abilities** such as focus, recall, and problem-solving. The idea of this project is motivated by the need to blend **learning with entertainment**, creating an engaging environment where users can practice memory retention while enjoying gameplay. Furthermore, many students find it difficult to relate MATLAB to real-world, non-technical applications. Developing this game shows MATLAB's **versatility beyond computations**, serving as a simple and fun example of applying programming concepts like arrays, randomization, and logic building in a GUI-based project.

MATLAB Software

MATLAB (Matrix Laboratory) is a powerful environment for computation, visualization, and programming. Among its many tools, **App Designer** allows developers to create professional GUIs with interactive elements such as buttons, labels, images, and timers. In this project, App Designer is used to design the puzzle layout and integrate the underlying game logic. MATLAB's simple syntax and wide range of built-in functions make it effective for developing this type of application, showing how the software can be extended from **engineering and simulations to interactive learning and entertainment**.

II. PROBLEM STATEMENT AND OBJECTIVES

Problem Statement

While MATLAB is primarily recognized as a powerful tool for engineering, computation, and simulations, its capability to create **interactive applications and games** is less explored. Traditional approaches to teaching MATLAB focus on numerical problem solving, which may not always engage beginners effectively. A **memory puzzle game** serves as a fun and educational example that not only entertains but also strengthens cognitive skills such as memory and concentration. The challenge lies in designing a **graphical user interface (GUI)** that integrates game logic, real-time scoring, and a countdown timer, while maintaining simplicity and user engagement.

Objectives

The main objectives of this project are:

1. To design a **user-friendly GUI** for the Memory Puzzle Game using MATLAB App Designer.
2. To implement **game logic** for card shuffling, revealing, matching, and hiding.
3. To develop a **scoring system** that rewards correct matches and penalizes mismatches.
4. To integrate a **countdown timer** to create time-based gameplay and increase challenge.
5. To implement **game control features** such as Start, Restart, and Give Up options.
6. To demonstrate MATLAB's **versatility** by applying it to interactive game development, beyond its traditional use in engineering applications.

III. METHODOLOGY

The methodology for the development of the Memory Puzzle Game focuses on **game layout design, logic implementation, and integration of scoring and timing systems**. The steps followed ensure that the game is interactive, user-friendly, and functionally robust.

3.1 Approach:

The overall approach to building the game can be summarized in the following phases:

1. **Planning** – Define the game rules, grid size, scoring system, and win/lose conditions.
2. **Interface Design** – Create the graphical layout in MATLAB App Designer, including the grid of buttons, score display, timer, and control buttons.
3. **Logic Implementation** – Develop the code to handle card shuffling, card flipping, match checking, and game state management.
4. **Integration of Features** – Add the scoring system, countdown timer, and control functions (Start, Restart, Give Up).
5. **Testing** – Run multiple trials to ensure correct functionality, validate randomization, and check end-game conditions.
6. **Refinement** – Improve usability by adding messages, brief card preview at the start, and disabling matched buttons to enhance user experience.

This stepwise approach ensures that the game is built systematically and that each feature works cohesively with the others.

3.2 Game Layout:

The GUI was designed using **MATLAB App Designer** and consists of:

- A **4x4 grid** of 16 buttons as the puzzle cards.
- A **scoreboard** to display real-time score updates.
- A **countdown timer** to track the remaining playtime.
- **Control buttons** for Start, Restart, and Give Up options.

- Labels and messages to provide guidance and feedback.

3.3 Card Shuffling and Randomization:

At the start of each session, eight unique images are duplicated, paired, and randomly shuffled into 16 card positions. This ensures a new challenge each time the game is played.

3.4 Gameplay Logic:

1. At the beginning, all cards are briefly revealed for memorization.
2. Players flip two cards per turn.
3. If the cards match → they remain revealed, the score increases, and buttons are disabled.
4. If they do not match → cards flip back after a short pause, and the score decreases.
5. The cycle continues until all pairs are matched, time expires, or the player chooses to quit.

3.5 Scoring System:

- **Correct match** → +10 points.
- **Incorrect match** → −5 points.

  The scoring system provides a balance between reward and penalty, encouraging accuracy.

3.6 Timer Functionality:

A **countdown timer** (e.g., 60 seconds) is implemented using MATLAB's timer functions. When the timer reaches zero, the game ends automatically with a loss message, adding urgency to the gameplay.

3.7 Game Control Features:

- **Start** → initializes a new game with randomized cards.
- **Restart** → reshuffles cards, resets score and timer.
- **Give Up** → ends the game immediately.

IV. RESULTS

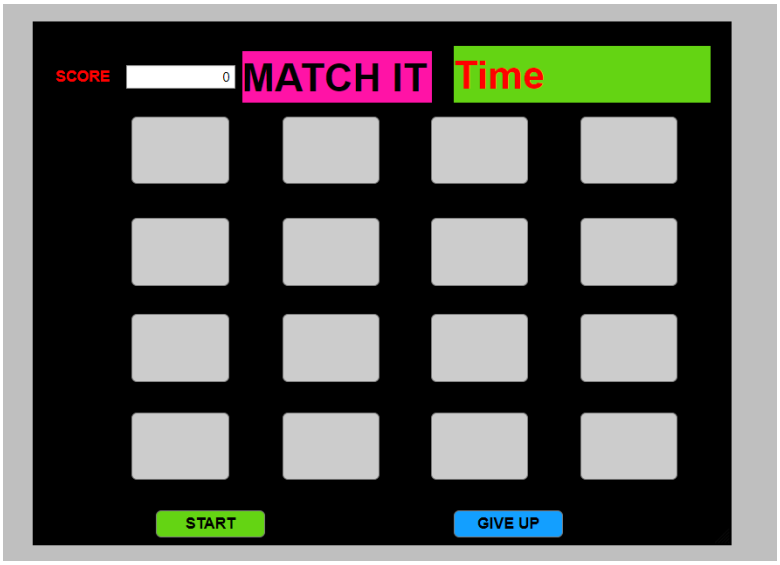

Figure 1: Initial game interface with grid, score, timer, and controls.

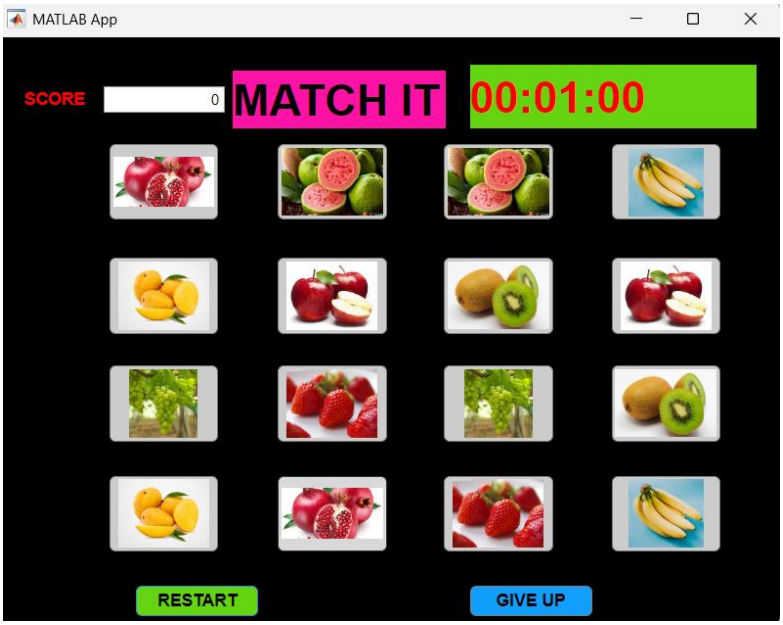

Figure 2: Card preview at the start showing randomized pairs.

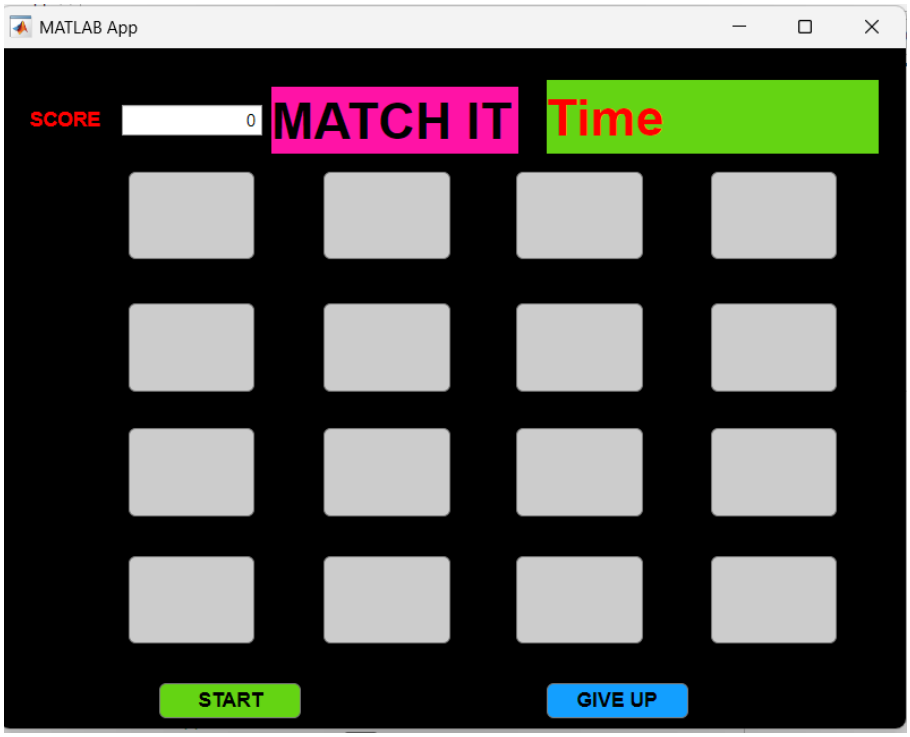

Figure 3: Gameplay in progress with two cards flipped.

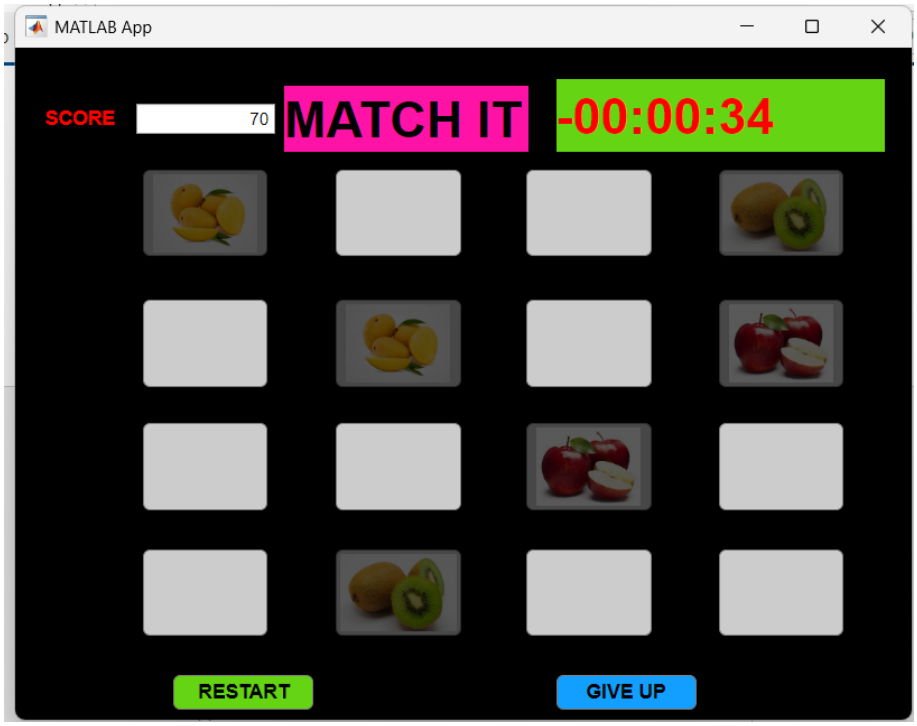

Figure 4: Correct match displayed with score increment and disabled buttons.

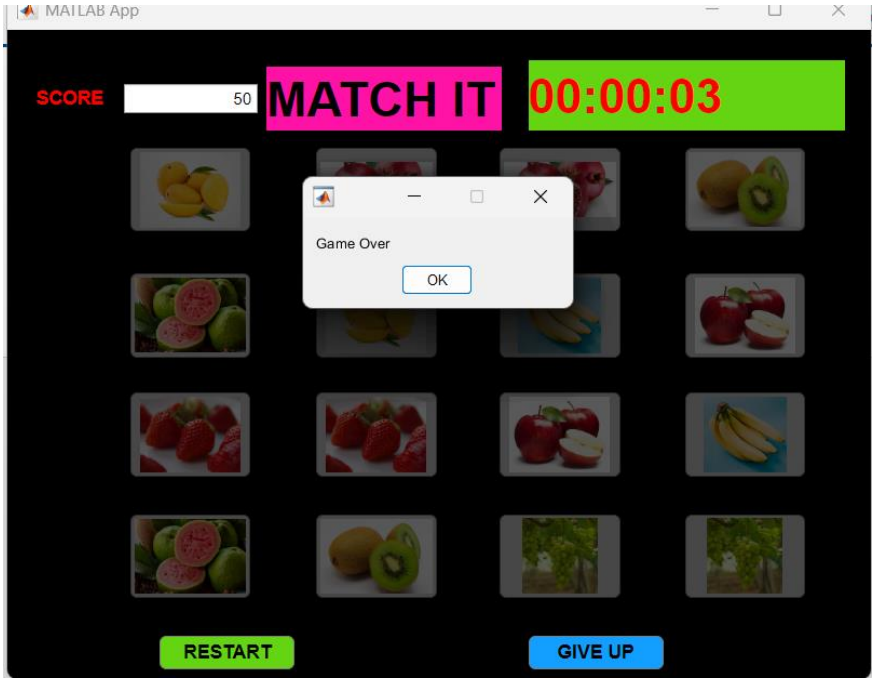

Figure 5: Winning condition with all pairs matched and success message.

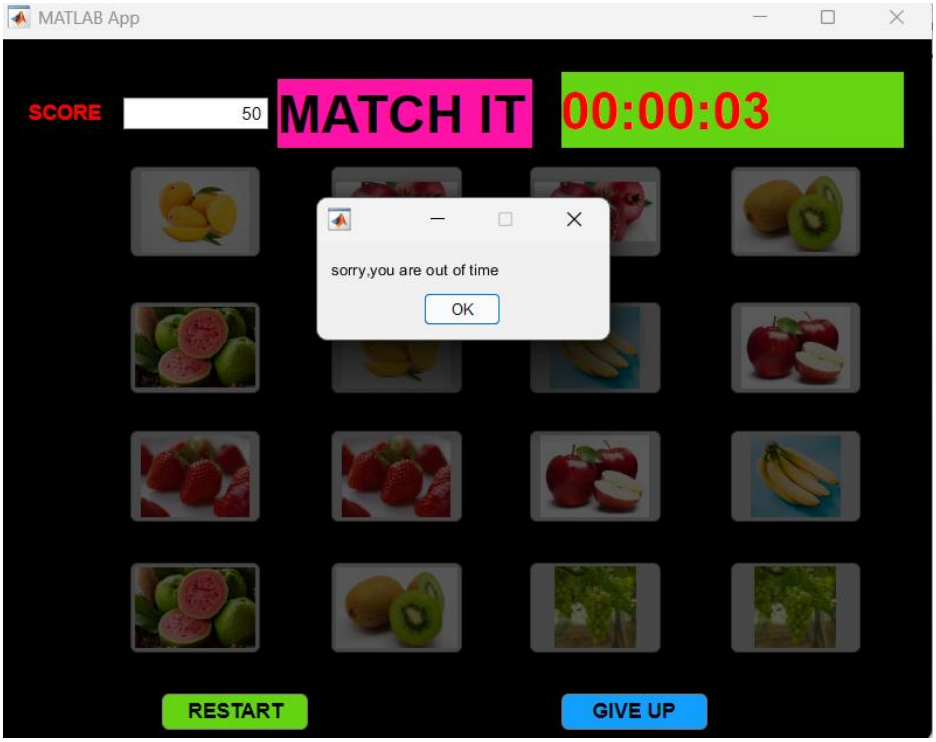

Figure 6: Game over screen when timer expires before completion.

V. DISCUSSION AND LIMITATIONS

Discussion

The Memory Puzzle Game developed using MATLAB App Designer successfully demonstrates the use of GUI-based programming for interactive applications. The game integrates **card shuffling, matching logic, scoring, and countdown timer** into a cohesive system, offering both entertainment and cognitive training. The results show that the game responds accurately to user interactions, updates scores in real time, and properly executes win and loss conditions. The implementation highlights MATLAB's flexibility beyond traditional engineering and simulation tasks, showing its capability in developing **educational games and interactive learning tools**.

Limitations

1. The game has a **fixed 4x4 grid** and does not support higher difficulty levels.
2. Only a **single theme of card values** is used, limiting variety.
3. The **timer duration is fixed** and cannot be customized by the player.
4. There is no **data storage** for tracking player performance across sessions.
5. The interface is basic and lacks advanced features like **sound effects or animations**.

VI. CONCLUSION

The Memory Puzzle Game developed in MATLAB App Designer successfully demonstrates the use of graphical user interfaces for creating interactive applications beyond conventional engineering problems. The game integrates essential features such as randomized card placement, scoring logic, countdown timer, and user control options into a simple and engaging design. The results validate the correctness of the gameplay, where score updates, timer functionality, and win/loss conditions work as intended. This project highlights the versatility of MATLAB in combining **programming, logic, and user interaction** within a single platform. While the current version is limited to a fixed grid and basic features, it provides a strong foundation for future enhancements such as adjustable difficulty levels, multiple card themes, sound effects, and data tracking for performance analysis. Overall, the project achieves its objective of developing an **educational and entertaining application** while showcasing MATLAB's potential in GUI-based game development.

VII. REFERENCES

1. MathWorks, *MATLAB App Designer Documentation*, [Online]. Available: https://www.mathworks.com/help/matlab/app-designer.html. [Accessed: Aug. 2025].
2. MathWorks, *Timer Objects in MATLAB*, [Online]. Available: https://www.mathworks.com/help/matlab/ref/timer.html. [Accessed: Aug. 2025].
3. Cleve Moler, *Experiments with MATLAB*, MathWorks, 2021.
4. MATLAB Central File Exchange, "Memory Game Projects," [Online]. Available: https://www.mathworks.com/matlabcentral/fileexchange/. [Accessed: Aug. 2025].
5. R. Pratap, *Getting Started with MATLAB: A Quick Introduction for Scientists and Engineers*, 7th ed., Oxford University Press, 2021.

VIII. APPENDICES

MATLAB Code:

```
classdef memory_puzzle < matlab.apps.AppBase
    % Properties that correspond to app components
    properties (Access = public)
        UIFigure              matlab.ui.Figure
        TimeLabel             matlab.ui.control.Label
        SCOREEditField        matlab.ui.control.NumericEditField
        SCOREEditFieldLabel   matlab.ui.control.Label
        GIVEUPButton          matlab.ui.control.Button
        STARTButton           matlab.ui.control.Button
        Button_16             matlab.ui.control.Button
        Button_15             matlab.ui.control.Button
        Button_14             matlab.ui.control.Button
        Button_13             matlab.ui.control.Button
        Button_12             matlab.ui.control.Button
        Button_11             matlab.ui.control.Button
        Button_10             matlab.ui.control.Button
        Button_9              matlab.ui.control.Button
        Button_8              matlab.ui.control.Button
        Button_7              matlab.ui.control.Button
        Button_6              matlab.ui.control.Button
        Button_5              matlab.ui.control.Button
        Button_4              matlab.ui.control.Button
        Button_3              matlab.ui.control.Button
```

```
    Button_2            matlab.ui.control.Button
    Button_1            matlab.ui.control.Button
    MATCHITLabel        matlab.ui.control.Label
  End
  properties (Access = public)
    a;
    b;
    c;
    i;
    j=0;
    p=0;
    s=100;

    d;
    e;
    f;
    g;
    h;
    k;
    m;
    n;
    but1;
    but2;
    but3;
    but4;
    but5;
    but6;
```

```
    but7;
    but8;
    but9;
    but10;
    but11;
    but12;
    but13;
    but14;
    but15;
    but16;
    count = 0;
end

properties (Access = private)
    GameOver = false;
end

methods (Access = public)
    function results = func2(app)
        if(app.j==1)
            app.Button_1.Enable='off';
        elseif(app.j==2)
            app.Button_2.Enable='off';
        elseif(app.j==3)
            app.Button_3.Enable='off';
        elseif(app.j==4)
            app.Button_4.Enable='off';
```

```
        elseif(app.j==5)
            app.Button_5.Enable='off';
        elseif(app.j==6)
            app.Button_6.Enable='off';
        elseif(app.j==7)
            app.Button_7.Enable='off';
        elseif(app.j==8)
            app.Button_8.Enable='off';
        elseif(app.j==9)
            app.Button_9.Enable='off';
        elseif(app.j==10)
            app.Button_10.Enable='off';
        elseif(app.j==11)
            app.Button_11.Enable='off';
        elseif(app.j==12)
            app.Button_12.Enable='off';
        elseif(app.j==13)
            app.Button_13.Enable='off';
        elseif(app.j==14)
            app.Button_14.Enable='off';
        elseif(app.j==15)
            app.Button_15.Enable='off';
        else
            app.Button_16.Enable='off';
        end
    end
```

```
function results = func3(app)
    if(app.j==1)
        app.Button_1.Icon='';
    elseif(app.j==2)
        app.Button_2.Icon='';
    elseif(app.j==3)
        app.Button_3.Icon='';
    elseif(app.j==4)
        app.Button_4.Icon='';
    elseif(app.j==5)
        app.Button_5.Icon='';
    elseif(app.j==6)
        app.Button_6.Icon='';
    elseif(app.j==7)
        app.Button_7.Icon='';
    elseif(app.j==8)
        app.Button_8.Icon='';
    elseif(app.j==9)
        app.Button_9.Icon='';
    elseif(app.j==10)
        app.Button_10.Icon='';
    elseif(app.j==11)
        app.Button_11.Icon='';
    elseif(app.j==12)
        app.Button_12.Icon='';
    elseif(app.j==13)
        app.Button_13.Icon='';
```

```
    elseif(app.j==14)
        app.Button_14.Icon='';
    elseif(app.j==15)
        app.Button_15.Icon='';
    else
        app.Button_16.Icon='';

    end
end

function results = func(app)
    app.SCOREEditField.Value=app.s;
    app.d=datetime('12:03:00','Format','hh:mm:ss');
    app.e=datetime('12:04:00','Format','hh:mm:ss');
    app.f=app.e-app.d;
    app.h=datetime('now','Format','hh:mm:ss');
    app.k=app.h-app.g;
    app.m=app.k-app.f;
    app.n=string(app.m);
    app.TimeLabel.Text=app.n;

    if (app.s<=0)
        msgbox('sorry you were  out of moves,please try again')

    app.Button_1.Icon=app.but1;
    app.Button_2.Icon=app.but2;
    app.Button_3.Icon=app.but3;
```

```
app.Button_4.Icon=app.but4;
app.Button_5.Icon=app.but5;
app.Button_6.Icon=app.but6;
app.Button_7.Icon=app.but7;
app.Button_8.Icon=app.but8;
app.Button_9.Icon=app.but9;
app.Button_10.Icon=app.but10;
app.Button_11.Icon=app.but11;
app.Button_12.Icon=app.but12;
app.Button_13.Icon=app.but13;
app.Button_14.Icon=app.but14;
app.Button_15.Icon=app.but15;
app.Button_16.Icon=app.but16;

app.Button_1.Enable="off";
app.Button_2.Enable="off";
app.Button_3.Enable="off";
app.Button_4.Enable="off";
app.Button_5.Enable="off";
app.Button_6.Enable="off";
app.Button_7.Enable="off";
app.Button_8.Enable="off";
app.Button_9.Enable="off";
app.Button_10.Enable="off";
app.Button_11.Enable="off";
app.Button_12.Enable="off";
app.Button_13.Enable="off";
```

```
app.Button_14.Enable="off";
app.Button_15.Enable="off";
app.Button_16.Enable="off";

app.GIVEUPButton.Enable='off';
app.STARTButton.Enable='on';



app.SCOREEditField.Value=0;

app.p=0;
elseif(app.k>app.f)
   msgbox('sorry,you are out of time');
elseif(app.SCOREEditField.Value==50);
   msgbox("Game Over");

   app.Button_1.Enable="off";
   app.Button_2.Enable="off";
   app.Button_3.Enable="off";
   app.Button_4.Enable="off";
   app.Button_5.Enable="off";
   app.Button_6.Enable="off";
   app.Button_7.Enable="off";
   app.Button_8.Enable="off";
   app.Button_9.Enable="off";
   app.Button_10.Enable="off";
   app.Button_11.Enable="off";
```

```
            app.Button_12.Enable="off";
            app.Button_13.Enable="off";
            app.Button_14.Enable="off";
            app.Button_15.Enable="off";
            app.Button_16.Enable="off";

            app.GameOver = true
        end

        if(app.p==8)
            msgbox('Hurray! you have won the game');
            app.p=0;
            app.STARTButton.Enable='on';
    end
  end
end

  % Callbacks that handle component events
  methods (Access = private)
    % Button pushed function: STARTButton
    function STARTButtonPushed(app, event)

        app.a=[1:8 1:8];
        app.b=randperm(16);
        app.c=app.a(app.b(1:16));
        app.d=datetime('12:03:00','Format','hh:mm:ss');
        app.e=datetime('12:04:00','Format','hh:mm:ss');
```

```
app.f=app.e-app.d;
app.m=string(app.f);
app.TimeLabel.Text=app.m;
app.g=datetime('now','Format','hh,mm,ss');

if(app.c(1)==1)
   app.Button_1.Icon='1.jpeg';
   app.but1='1.jpeg';
elseif(app.c(1)==2)
   app.Button_1.Icon='2.jpeg';
   app.but1='2.jpeg';
elseif(app.c(1)==3)
   app.Button_1.Icon='3.jpeg';
   app.but1='3.jpeg';
elseif(app.c(1)==4)
   app.Button_1.Icon='4.jpeg';
   app.but1='4.jpeg';
elseif(app.c(1)==5)
   app.Button_1.Icon='5.jpeg';
   app.but1='5.jpeg';
elseif(app.c(1)==6)
   app.Button_1.Icon='6.jpeg';
   app.but1='6.jpeg';
elseif(app.c(1)==7)
   app.Button_1.Icon='7.jpeg';
   app.but1='7.jpeg';
else
```

```
    app.Button_1.Icon='9.jpeg';
    app.but1='9.jpeg';
end

if(app.c(2)==1)
    app.Button_2.Icon='1.jpeg';
    app.but2='1.jpeg';
elseif(app.c(2)==2)
    app.Button_2.Icon='2.jpeg';
    app.but2='2.jpeg';
elseif(app.c(2)==3)
    app.Button_2.Icon='3.jpeg';
    app.but2='3.jpeg';
elseif(app.c(2)==4)
    app.Button_2.Icon='4.jpeg';
    app.but2='4.jpeg';
elseif(app.c(2)==5)
    app.Button_2.Icon='5.jpeg';
    app.but2='5.jpeg';
elseif(app.c(2)==6)
    app.Button_2.Icon='6.jpeg';
    app.but2='6.jpeg';
elseif(app.c(2)==7)
    app.Button_2.Icon='7.jpeg';
    app.but2='7.jpeg';
else
    app.Button_2.Icon='9.jpeg';
```

```
    app.but2='9.jpeg';
end
if(app.c(3)==1)
    app.Button_3.Icon='1.jpeg';
    app.but3='1.jpeg';
elseif(app.c(3)==2)
    app.Button_3.Icon='2.jpeg';
    app.but3='2.jpeg';
elseif(app.c(3)==3)
    app.Button_3.Icon='3.jpeg';
    app.but3='3.jpeg';
elseif(app.c(3)==4)
    app.Button_3.Icon='4.jpeg';
    app.but3='4.jpeg';
elseif(app.c(3)==5)
    app.Button_3.Icon='5.jpeg';
    app.but3='5.jpeg';
elseif(app.c(3)==6)
    app.Button_3.Icon='6.jpeg';
    app.but3='6.jpeg';
elseif(app.c(3)==7)
    app.Button_3.Icon='7.jpeg';
    app.but3='7.jpeg';
else
    app.Button_3.Icon='9.jpeg';
    app.but3='9.jpeg';
end
```

```
if(app.c(4)==1)
    app.Button_4.Icon='1.jpeg';
    app.but4='1.jpeg';
elseif(app.c(4)==2)
    app.Button_4.Icon='2.jpeg';
    app.but4='2.jpeg';
elseif(app.c(4)==3)
    app.Button_4.Icon='3.jpeg';
    app.but4='3.jpeg';
elseif(app.c(4)==4)
    app.Button_4.Icon='4.jpeg';
    app.but4='4.jpeg';
elseif(app.c(4)==5)
    app.Button_4.Icon='5.jpeg';
    app.but4='5.jpeg';
elseif(app.c(4)==6)
    app.Button_4.Icon='6.jpeg';
    app.but4='6.jpeg';
elseif(app.c(4)==7)
    app.Button_4.Icon='7.jpeg';
    app.but4='7.jpeg';
else
    app.Button_4.Icon='9.jpeg';
    app.but4='9.jpeg';
end
```

```
if(app.c(5)==1)
    app.Button_5.Icon='1.jpeg';
    app.but5='1.jpeg';
elseif(app.c(5)==2)
    app.Button_5.Icon='2.jpeg';
    app.but5='2.jpeg';
elseif(app.c(5)==3)
    app.Button_5.Icon='3.jpeg';
    app.but5='3.jpeg';
elseif(app.c(5)==4)
    app.Button_5.Icon='4.jpeg';
    app.but5='4.jpeg';
elseif(app.c(5)==5)
    app.Button_5.Icon='5.jpeg';
    app.but5='5.jpeg';
elseif(app.c(5)==6)
    app.Button_5.Icon='6.jpeg';
    app.but5='6.jpg';
elseif(app.c(5)==7)
    app.Button_5.Icon='7.jpg';
    app.but5='7.jpeg';
else
    app.Button_5.Icon='9.jpeg';
    app.but5='9.jpeg';
end
```

```
if(app.c(6)==1)
    app.Button_6.Icon='1.jpeg';
    app.but6='1.jpeg';
elseif(app.c(6)==2)
    app.Button_6.Icon='2.jpeg';
    app.but6='2.jpeg';
elseif(app.c(6)==3)
    app.Button_6.Icon='3.jpeg';
    app.but6='3.jpeg';
elseif(app.c(6)==4)
    app.Button_6.Icon='4.jpeg';
    app.but6='4.jpeg';
elseif(app.c(6)==5)
    app.Button_6.Icon='5.jpeg';
    app.but6='5.jpeg';
elseif(app.c(6)==6)
    app.Button_6.Icon='6.jpeg';
    app.but6='6.jpeg';
elseif(app.c(6)==7)
    app.Button_6.Icon='7.jpeg';
    app.but6='7.jpeg';
else
    app.Button_6.Icon='9.jpeg';
    app.but6='9.jpeg';
end
```

```
if(app.c(7)==1)
    app.Button_7.Icon='1.jpeg';
    app.but7='1.jpeg';
elseif(app.c(7)==2)
    app.Button_7.Icon='2.jpeg';
    app.but7='2.jpeg';
elseif(app.c(7)==3)
    app.Button_7.Icon='3.jpeg';
    app.but7='3.jpeg';
elseif(app.c(7)==4)
    app.Button_7.Icon='4.jpeg';
    app.but7='4.jpg';
elseif(app.c(7)==5)
    app.Button_7.Icon='5.jpg';
    app.but7='5.jpeg';
elseif(app.c(7)==6)
    app.Button_7.Icon='6.jpeg';
    app.but7='6.jpeg';
elseif(app.c(7)==7)
    app.Button_7.Icon='7.jpeg';
    app.but7='7.jpeg';
else
    app.Button_7.Icon='9.jpeg';
    app.but7='9.jpeg';
end
```

```
if(app.c(8)==1)
    app.Button_8.Icon='1.jpeg';
    app.but8='1.jpeg';
elseif(app.c(8)==2)
    app.Button_8.Icon='2.jpeg';
    app.but8='2.jpeg';
elseif(app.c(8)==3)
    app.Button_8.Icon='3.jpeg';
    app.but8='3.jpeg';
elseif(app.c(8)==4)
    app.Button_8.Icon='4.jpeg';
    app.but8='4.jpeg';
elseif(app.c(8)==5)
    app.Button_8.Icon='5.jpeg';
    app.but8='5.jpeg';
elseif(app.c(8)==6)
    app.Button_8.Icon='6.jpeg';
    app.but8='6.jpeg';
elseif(app.c(8)==7)
    app.Button_8.Icon='7.jpeg';
    app.but8='7.jpeg';
else
    app.Button_8.Icon='9.jpeg';
    app.but8='9.jpeg';
end
```

```
if(app.c(9)==1)
    app.Button_9.Icon='1.jpeg';
    app.but9='1.jpeg';
elseif(app.c(9)==2)
    app.Button_9.Icon='2.jpeg';
    app.but9='2.jpeg';
elseif(app.c(9)==3)
    app.Button_9.Icon='3.jpeg';
    app.but9='3.jpeg';
elseif(app.c(9)==4)
    app.Button_9.Icon='4.jpeg';
    app.but9='4.jpeg';
elseif(app.c(9)==5)
    app.Button_9.Icon='5.jpeg';
    app.but9='5.jpeg';
elseif(app.c(9)==6)
    app.Button_9.Icon='6.jpeg';
    app.but9='6.jpeg';
elseif(app.c(9)==7)
    app.Button_9.Icon='7.jpeg';
    app.but9='7.jpeg';
else
    app.Button_9.Icon='9.jpeg';
    app.but9='9.jpeg';
end
```

```
if(app.c(10)==1)
    app.Button_10.Icon='1.jpeg';
    app.but10='1.jpeg';
elseif(app.c(10)==2)
    app.Button_10.Icon='2.jpeg';
    app.but10='2.jpeg';
elseif(app.c(10)==3)
    app.Button_10.Icon='3.jpeg';
    app.but10='3.jpeg';
elseif(app.c(10)==4)
    app.Button_10.Icon='4.jpeg';
    app.but10='4.jpeg';
elseif(app.c(10)==5)
    app.Button_10.Icon='5.jpeg';
    app.but10='5.jpeg';
elseif(app.c(10)==6)
    app.Button_10.Icon='6.jpeg';
    app.but10='6.jpeg';
elseif(app.c(10)==7)
    app.Button_10.Icon='7.jpeg';
    app.but10='7.jpeg';
else
    app.Button_10.Icon='9.jpeg';
    app.but10='9.jpeg';
end
```

```
if(app.c(11)==1)
    app.Button_11.Icon='1.jpeg';
    app.but11='1.jpeg';
elseif(app.c(11)==2)
    app.Button_11.Icon='2.jpeg';
    app.but11='2.jpeg';
elseif(app.c(11)==3)
    app.Button_11.Icon='3.jpeg';
    app.but11='3.jpeg';
elseif(app.c(11)==4)
    app.Button_11.Icon='4.jpeg';
    app.but11='4.jpeg';
elseif(app.c(11)==5)
    app.Button_11.Icon='5.jpeg';
    app.but11='5.jpeg';
elseif(app.c(11)==6)
    app.Button_11.Icon='6.jpeg';
    app.but11='6.jpeg';
elseif(app.c(11)==7)
    app.Button_11.Icon='7.jpeg';
    app.but11='7.jpeg';
else
    app.Button_11.Icon='9.jpeg';
    app.but11='9.jpeg';
end
```

```
if(app.c(12)==1)
    app.Button_12.Icon='1.jpeg';
    app.but12='1.jpeg';
elseif(app.c(12)==2)
    app.Button_12.Icon='2.jpeg';
    app.but12='2.jpeg';
elseif(app.c(12)==3)
    app.Button_12.Icon='3.jpeg';
    app.but12='3.jpeg';
elseif(app.c(12)==4)
    app.Button_12.Icon='4.jpeg';
    app.but12='4.jpeg';
elseif(app.c(12)==5)
    app.Button_12.Icon='5.jpeg';
    app.but12='5.jpeg';
elseif(app.c(12)==6)
    app.Button_12.Icon='6.jpeg';
    app.but12='6.jpeg';
elseif(app.c(12)==7)
    app.Button_12.Icon='7.jpeg';
    app.but12='7.jpeg';
else
    app.Button_12.Icon='9.jpeg';
    app.but12='9.jpeg';
end
```

```
if(app.c(13)==1)
    app.Button_13.Icon='1.jpeg';
    app.but13='1.jpeg';
elseif(app.c(13)==2)
    app.Button_13.Icon='2.jpeg';
    app.but13='2.jpeg';
elseif(app.c(13)==3)
    app.Button_13.Icon='3.jpeg';
    app.but13='3.jpeg';
elseif(app.c(13)==4)
    app.Button_13.Icon='4.jpeg';
    app.but13='4.jpeg';
elseif(app.c(13)==5)
    app.Button_13.Icon='5.jpeg';
    app.but13='5.jpeg';
elseif(app.c(13)==6)
    app.Button_13.Icon='6.jpeg';
    app.but13='6.jpeg';
elseif(app.c(13)==7)
    app.Button_13.Icon='7.jpeg';
    app.but13='7.jpeg';
else
    app.Button_13.Icon='9.jpeg';
    app.but13='9.jpeg';
end
```

```
 if(app.c(14)==1)
    app.Button_14.Icon='1.jpeg';
    app.but14='1.jpeg';
elseif(app.c(14)==2)
    app.Button_14.Icon='2.jpeg';
    app.but14='2.jpeg';
elseif(app.c(14)==3)
    app.Button_14.Icon='3.jpeg';
    app.but14='3.jpeg';
elseif(app.c(14)==4)
    app.Button_14.Icon='4.jpeg';
    app.but14='4.jpeg';
elseif(app.c(14)==5)
    app.Button_14.Icon='5.jpeg';
    app.but14='5.jpeg';
elseif(app.c(14)==6)
    app.Button_14.Icon='6.jpeg';
    app.but14='6.jpeg';
elseif(app.c(14)==7)
    app.Button_14.Icon='7.jpeg';
    app.but14='7.jpeg';
else
    app.Button_14.Icon='9.jpeg';
    app.but14='9.jpeg';
end
```

```
if(app.c(15)==1)
    app.Button_15.Icon='1.jpeg';
    app.but15='1.jpeg';
elseif(app.c(15)==2)
    app.Button_15.Icon='2.jpeg';
    app.but15='2.jpeg';
elseif(app.c(15)==3)
    app.Button_15.Icon='3.jpeg';
    app.but15='3.jpeg';
elseif(app.c(15)==4)
    app.Button_15.Icon='4.jpeg';
    app.but15='4.jpeg';
elseif(app.c(15)==5)
    app.Button_15.Icon='5.jpeg';
    app.but15='5.jpeg';
elseif(app.c(15)==6)
    app.Button_15.Icon='6.jpeg';
    app.but15='6.jpeg';
elseif(app.c(15)==7)
    app.Button_15.Icon='7.jpeg';
    app.but15='7.jpeg';
else
    app.Button_15.Icon='9.jpeg';
    app.but15='9.jpeg';
end
```

```
if(app.c(16)==1)
    app.Button_16.Icon='1.jpeg';
    app.but16='1.jpeg';
elseif(app.c(16)==2)
    app.Button_16.Icon='2.jpeg';
    app.but16='2.jpeg';
elseif(app.c(16)==3)
    app.Button_16.Icon='3.jpeg';
    app.but16='3.jpeg';
elseif(app.c(16)==4)
    app.Button_16.Icon='4.jpeg';
    app.but16='4.jpeg';
elseif(app.c(16)==5)
    app.Button_16.Icon='5.jpeg';
    app.but16='5.jpeg';
elseif(app.c(16)==6)
    app.Button_16.Icon='6.jpeg';
    app.but16='6.jpeg';
elseif(app.c(16)==7)
    app.Button_16.Icon='7.jpeg';
    app.but16='7.jpeg';
else
    app.Button_16.Icon='9.jpeg';
    app.but16='9.jpeg';
end
pause(3);
app.Button_1.Icon='';
```

```
app.Button_2.Icon='';
app.Button_3.Icon='';
app.Button_4.Icon='';
app.Button_5.Icon='';
app.Button_6.Icon='';
app.Button_7.Icon='';
app.Button_8.Icon='';
app.Button_9.Icon='';
app.Button_10.Icon='';
app.Button_11.Icon='';
app.Button_12.Icon='';
app.Button_12.Icon='';
app.Button_13.Icon='';
app.Button_14.Icon='';
app.Button_15.Icon='';
app.Button_16.Icon='';

app.Button_1.Enable='on';
app.Button_2.Enable='on';
app.Button_3.Enable='on';
app.Button_4.Enable='on';
app.Button_5.Enable='on';
app.Button_6.Enable='on';
app.Button_7.Enable='on';
app.Button_8.Enable='on';
app.Button_9.Enable='on';
app.Button_10.Enable='on';
```

```
        app.Button_11.Enable='on';
        app.Button_12.Enable='on';
        app.Button_12.Enable='on';
        app.Button_13.Enable='on';
        app.Button_14.Enable='on';
        app.Button_15.Enable='on';
        app.Button_16.Enable='on';

        app.STARTButton.Text='RESTART';
        app.GIVEUPButton.Enable="on";
    end

    % Button pushed function: Button_1
    function Button_1Pushed(app, event)
if app.GameOver
    return;
end
 if(app.j~=1)
        app.Button_1.Icon=app.but1;
        app.count=app.count+1;
        if(app.count==2)
            if (app.c(1)==app.i)
                app.Button_1.Enable='off';
                app.p=app.p+1
                func2(app);
                app.count=0;
            else
```

```
            func3(app);
            app.i=app.c(1);
            app.j=1;
            app.count=app.count-1;
            app.s=app.s-5;
        end
    else
        app.i=app.c(1);
        app.j=1 ;
    end
end
func(app);
 end

 % Button pushed function: Button_2
 function Button_2Pushed(app, event)
if app.GameOver
   return;
end
if(app.j~=2)
    app.Button_2.Icon=app.but2;
    app.count=app.count+1;
    if(app.count==2)
        if (app.c(2)==app.i)
            app.Button_2.Enable='off';
            app.p=app.p+1
            func2(app);
```

```
            app.count=0;
        else
            func3(app);
            app.i=app.c(2);
            app.j=2;
            app.count=app.count-1;
            app.s=app.s-5;
        end
    else
        app.i=app.c(2);
        app.j=2 ;
    end
end
func(app);
 end

 % Button pushed function: Button_3
 function Button_3Pushed(app, event)
if app.GameOver
   return;
end
 if(app.j~=3)
    app.Button_3.Icon=app.but3;
    app.count=app.count+1;
    if(app.count==2)
        if (app.c(3)==app.i)
            app.Button_3.Enable='off';
```

```
            app.p=app.p+1
            func2(app);
            app.count=0;
        else
            func3(app);
            app.i=app.c(3);
            app.j=3;
            app.count=app.count-1;
            app.s=app.s-5;
        end
    else
        app.i=app.c(3);
        app.j=3 ;
    end
end
 func(app);
  end

  % Button pushed function: Button_4
  function Button_4Pushed(app, event)
if app.GameOver
   return;
end
 if(app.j~=4)
    app.Button_4.Icon=app.but4;
    app.count=app.count+1;
    if(app.count==2)
```

```
            if (app.c(4)==app.i)
                app.Button_4.Enable='off';
                app.p=app.p+1
                func2(app);
                app.count=0;
            else
                func3(app);
                app.i=app.c(4);
                app.j=4;
                app.count=app.count-1;
                app.s=app.s-5;
            end
        else
            app.i=app.c(4);
            app.j=4 ;
        end
    end
     func(app);
      end


      % Button pushed function: Button_5
      function Button_5Pushed(app, event)
    if app.GameOver
       return;
    end
    if(app.j~=5)
        app.Button_5.Icon=app.but5;
```

```
        app.count=app.count+1;
        if(app.count==2)
           if (app.c(5)==app.i)
              app.Button_5.Enable='off';
              app.p=app.p+1
              func2(app);
              app.count=0;
           else
              func3(app);
              app.i=app.c(5);
              app.j=5;
              app.count=app.count-1;
              app.s=app.s-5;
           end
        else
           % % app.i=app.c(5);
           app.j=5 ;
        end
    end
     func(app);
      end


      % Button pushed function: Button_6
      function Button_6Pushed(app, event)
    if app.GameOver
        return;
     end
```

```
if(app.j~=6)
    app.Button_6.Icon=app.but6;
    app.count=app.count+1;
    if(app.count==2)
       if (app.c(6)==app.i)
          app.Button_6.Enable='off';
          app.p=app.p+1
          func2(app);
          app.count=0;
       else
          func3(app);
          app.i=app.c(6);
          app.j=6;
          app.count=app.count-1;
          app.s=app.s-5;
       end
    else
       app.i=app.c(6);
       app.j=6 ;
    end
end
 func(app);
  end

  % Button pushed function: Button_7
  function Button_7Pushed(app, event)
if app.GameOver
```

```
    return;
end
if(app.j~=7)
    app.Button_7.Icon=app.but7;
    app.count=app.count+1;
    if(app.count==2)
        if (app.c(7)==app.i)
            app.Button_7.Enable='off';
            app.p=app.p+1
            func2(app);
            app.count=0;
        else
            func3(app);
            app.i=app.c(7);
            app.j=7;
            app.count=app.count-1;
            app.s=app.s-5;
        end
    else
        app.i=app.c(7);
        app.j=7 ;
    end
end
 func(app);
  end
```

```
  % Button pushed function: Button_8
  function Button_8Pushed(app, event)
if app.GameOver
   return;
end
if(app.j~=8)
    app.Button_8.Icon=app.but8;
    app.count=app.count+1;
    if(app.count==2)
       if (app.c(8)==app.i)
          app.Button_8.Enable='off';
          app.p=app.p+1
          func2(app);
          app.count=0;
       else
          func3(app);
          app.i=app.c(8);
          app.j=8;
          app.count=app.count-1;
          app.s=app.s-5;
       end
    else
       app.i=app.c(8);
       app.j=8 ;
    end
end
 func(app);
```

```
    end


    % Button pushed function: Button_9
    function Button_9Pushed(app, event)
if app.GameOver
    return;
end
 if(app.j~=9)
        app.Button_9.Icon=app.but9;
        app.count=app.count+1;
        if(app.count==2)
            if (app.c(9)==app.i)
                app.Button_9.Enable='off';
                app.p=app.p+1
                func2(app);
                app.count=0;
            else
                func3(app);
                app.i=app.c(9);
                app.j=9;
                app.count=app.count-1;
                app.s=app.s-5;
            end
        else
            app.i=app.c(9);
            app.j=9 ;
        end
```

```
end
 func(app);
  end


  % Button pushed function: Button_10
  function Button_10Pushed(app, event)
if app.GameOver
   return;
end
 if(app.j~=10)
     app.Button_10.Icon=app.but10;
     app.count=app.count+1;
     if(app.count==2)
        if (app.c(10)==app.i)
            app.Button_10.Enable='off';
            app.p=app.p+1
            func2(app);
            app.count=0;
        else
            func3(app);
            app.i=app.c(10);
            app.j=10;
            app.count=app.count-1;
            app.s=app.s-5;
        end
     else
        app.i=app.c(10);
```

```
            app.j=10 ;
        end
    end
     func(app);
      end


      % Button pushed function: Button_11
      function Button_11Pushed(app, event)
    if app.GameOver
        return;
    end
     if(app.j~=11)
        app.Button_11.Icon=app.but11;
        app.count=app.count+1;
        if(app.count==2)
            if (app.c(11)==app.i)
                app.Button_11.Enable='off';
                app.p=app.p+1
                func2(app);
                app.count=0;
            else
                func3(app);
                app.i=app.c(11);
                app.j=11;
                app.count=app.count-1;
                app.s=app.s-5;
```

```
            end
        else
            app.i=app.c(11);
            app.j=11 ;
        end
    end
 func(app);
  end


  % Button pushed function: Button_13
  function Button_13Pushed(app, event)
if app.GameOver
    return;
end
if(app.j~=13)
    app.Button_13.Icon=app.but13;
    app.count=app.count+1;
    if(app.count==2)
        if (app.c(13)==app.i)
            app.Button_13.Enable='off';
            app.p=app.p+1
            func2(app);
            app.count=0;
        else
            func3(app);
            app.i=app.c(13);
            app.j=13;
```

```
            app.count=app.count-1;
            app.s=app.s-5;
        end
    else
        app.i=app.c(13);
        app.j=13 ;
    end
end
 func(app);
  end

  % Button pushed function: Button_14
  function Button_14Pushed(app, event)
if app.GameOver
   return;
end
if(app.j~=14)
    app.Button_14.Icon=app.but14;
    app.count=app.count+1;
    if(app.count==2)
        if (app.c(14)==app.i)
            app.Button_14.Enable='off';
            app.p=app.p+1
            func2(app);
            app.count=0;
        else
            func3(app);
```

```
            app.i=app.c(14);
            app.j=14;
            app.count=app.count-1;
            app.s=app.s-5;
        end
    else
        app.i=app.c(14);
        app.j=14 ;
    end
end
 func(app);
  end

  % Button pushed function: Button_15
  function Button_15Pushed(app, event)
if app.GameOver
   return;
end
 if(app.j~=15)
    app.Button_15.Icon=app.but15;
    app.count=app.count+1;
    if(app.count==2)
        if (app.c(15)==app.i)
            app.Button_15.Enable='off';
            app.p=app.p+1
            func2(app);
            app.count=0;
```

```
            else
                func3(app);
                app.i=app.c(15);
                app.j=15;
                app.count=app.count-1;
                app.s=app.s-5;
            end
        else
            app.i=app.c(15);
            app.j=15 ;
        end
    end
    func(app);
     end

     % Button pushed function: Button_16
     function Button_16Pushed(app, event)
    if app.GameOver
       return;
    end
    if(app.j~=16)
        app.Button_16.Icon=app.but16;
        app.count=app.count+1;
        if(app.count==2)
            if (app.c(16)==app.i)
                app.Button_16.Enable='off';
                app.p=app.p+1
```

```
            func2(app);
            app.count=0;
        else
            func3(app);
            app.i=app.c(16);
            app.j=16;
            app.count=app.count-1;
            app.s=app.s-5;
        end
    else
        app.i=app.c(16);
        app.j=16;
    end
end
 func(app);
  end

  % Button pushed function: GIVEUPButton
  function GIVEUPButtonPushed(app, event)
     app.Button_1.Icon=app.but1;
     app.Button_2.Icon=app.but2;
     app.Button_3.Icon=app.but3;
     app.Button_4.Icon=app.but4;
     app.Button_5.Icon=app.but5;
     app.Button_6.Icon=app.but6;
     app.Button_7.Icon=app.but7;
     app.Button_8.Icon=app.but8;
```

```
app.Button_9.Icon=app.but9;
app.Button_10.Icon=app.but10;
app.Button_11.Icon=app.but11;
app.Button_12.Icon=app.but12;
app.Button_13.Icon=app.but13;
app.Button_14.Icon=app.but14;
app.Button_15.Icon=app.but15;
app.Button_16.Icon=app.but16;

app.Button_1.Enable="off";
app.Button_2.Enable="off";
app.Button_3.Enable="off";
app.Button_4.Enable="off";
app.Button_5.Enable="off";
app.Button_6.Enable="off";
app.Button_7.Enable="off";
app.Button_8.Enable="off";
app.Button_9.Enable="off";
app.Button_10.Enable="off";
app.Button_11.Enable="off";
app.Button_12.Enable="off";
app.Button_13.Enable="off";
app.Button_14.Enable="off";
app.Button_15.Enable="off";
app.Button_16.Enable="off";

app.GIVEUPButton.Enable='off';
```

```
    app.STARTButton.Enable='on';


    msgbox('sorry,better luck next time');
    app.SCOREEditField.Value=0;
    app.p=0;
end

% Button pushed function: Button_12
function Button_12Pushed(app, event)
    if(app.j~=12)
    app.Button_12.Icon=app.but12;
    app.count=app.count+1;
    if(app.count==2)
        if (app.c(12)==app.i)
            app.Button_12.Enable='off';
            app.p=app.p+1
            func2(app);
            app.count=0;
        else
            func3(app);
            app.i=app.c(12);
            app.j=12;
            app.count=app.count-1;
            app.s=app.s-5;
        end
    else
        app.i=app.c(12);
```

```
            app.j=12;
        end
    end
    func(app);
    end
end

% Component initialization
methods (Access = private)

    % Create UIFigure and components
    function createComponents(app)

        % Create UIFigure and hide until all components are created
        app.UIFigure = uifigure('Visible', 'off');
        app.UIFigure.Color = [0 0 0];
        app.UIFigure.Position = [100.2 100.2 640 480];
        app.UIFigure.Name = 'MATLAB App';

        % Create MATCHITLabel
        app.MATCHITLabel = uilabel(app.UIFigure);
        app.MATCHITLabel.BackgroundColor = [1 0.0745 0.651];
        app.MATCHITLabel.FontSize = 36;
        app.MATCHITLabel.FontWeight = 'bold';
        app.MATCHITLabel.Position = [193 407 174 47];
        app.MATCHITLabel.Text = 'MATCH IT';
```

```
            % Create Button_1
            app.Button_1 = uibutton(app.UIFigure, 'push');
            app.Button_1.ButtonPushedFcn = createCallbackFcn(app, @Button_1Pushed,
true);
            app.Button_1.BackgroundColor = [0.8 0.8 0.8];
            app.Button_1.Position = [92 332 89 62];
            app.Button_1.Text = '';

            % Create Button_2
            app.Button_2 = uibutton(app.UIFigure, 'push');
            app.Button_2.ButtonPushedFcn = createCallbackFcn(app, @Button_2Pushed,
true);
            app.Button_2.BackgroundColor = [0.8 0.8 0.8];
            app.Button_2.FontSize = 18;
            app.Button_2.Position = [92 239 89 62];
            app.Button_2.Text = '';

            % Create Button_3
            app.Button_3 = uibutton(app.UIFigure, 'push');
            app.Button_3.ButtonPushedFcn = createCallbackFcn(app, @Button_3Pushed,
true);
            app.Button_3.BackgroundColor = [0.8 0.8 0.8];
            app.Button_3.Position = [92 151 89 62];
            app.Button_3.Text = '';

            % Create Button_4
            app.Button_4 = uibutton(app.UIFigure, 'push');
```

```
            app.Button_4.ButtonPushedFcn = createCallbackFcn(app, @Button_4Pushed,
true);
            app.Button_4.BackgroundColor = [0.8 0.8 0.8];
            app.Button_4.Position = [92 61 89 62];
            app.Button_4.Text = '';

            % Create Button_5
            app.Button_5 = uibutton(app.UIFigure, 'push');
            app.Button_5.ButtonPushedFcn = createCallbackFcn(app, @Button_5Pushed,
true);
            app.Button_5.BackgroundColor = [0.8 0.8 0.8];
            app.Button_5.Position = [230 332 89 62];
            app.Button_5.Text = '';

            % Create Button_6
            app.Button_6 = uibutton(app.UIFigure, 'push');
            app.Button_6.ButtonPushedFcn = createCallbackFcn(app, @Button_6Pushed,
true);
            app.Button_6.BackgroundColor = [0.8 0.8 0.8];
            app.Button_6.Position = [230 239 89 62];
            app.Button_6.Text = '';

            % Create Button_7
            app.Button_7 = uibutton(app.UIFigure, 'push');
            app.Button_7.ButtonPushedFcn = createCallbackFcn(app, @Button_7Pushed,
true);
            app.Button_7.BackgroundColor = [0.8 0.8 0.8];
            app.Button_7.Position = [230 151 89 62];
```

```
            app.Button_7.Text = '';

            % Create Button_8
            app.Button_8 = uibutton(app.UIFigure, 'push');
            app.Button_8.ButtonPushedFcn = createCallbackFcn(app, @Button_8Pushed,
true);
            app.Button_8.BackgroundColor = [0.8 0.8 0.8];
            app.Button_8.Position = [230 61 89 62];
            app.Button_8.Text = '';

            % Create Button_9
            app.Button_9 = uibutton(app.UIFigure, 'push');
            app.Button_9.ButtonPushedFcn = createCallbackFcn(app, @Button_9Pushed,
true);
            app.Button_9.BackgroundColor = [0.8 0.8 0.8];
            app.Button_9.Position = [366 332 89 62];
            app.Button_9.Text = '';

            % Create Button_10
            app.Button_10 = uibutton(app.UIFigure, 'push');
            app.Button_10.ButtonPushedFcn = createCallbackFcn(app,
@Button_10Pushed, true);
            app.Button_10.BackgroundColor = [0.8 0.8 0.8];
            app.Button_10.Position = [366 239 89 62];
            app.Button_10.Text = '';

            % Create Button_11
            app.Button_11 = uibutton(app.UIFigure, 'push');
```

```
        app.Button_11.ButtonPushedFcn = createCallbackFcn(app,
@Button_11Pushed, true);

        app.Button_11.BackgroundColor = [0.8 0.8 0.8];

        app.Button_11.Position = [366 151 89 62];

        app.Button_11.Text = '';


        % Create Button_12

        app.Button_12 = uibutton(app.UIFigure, 'push');

        app.Button_12.ButtonPushedFcn = createCallbackFcn(app,
@Button_12Pushed, true);

        app.Button_12.BackgroundColor = [0.8 0.8 0.8];

        app.Button_12.Position = [366 61 89 62];

        app.Button_12.Text = '';


        % Create Button_13

        app.Button_13 = uibutton(app.UIFigure, 'push');

        app.Button_13.ButtonPushedFcn = createCallbackFcn(app,
@Button_13Pushed, true);

        app.Button_13.BackgroundColor = [0.8 0.8 0.8];

        app.Button_13.Position = [503 332 89 62];

        app.Button_13.Text = '';


        % Create Button_14

        app.Button_14 = uibutton(app.UIFigure, 'push');

        app.Button_14.ButtonPushedFcn = createCallbackFcn(app,
@Button_14Pushed, true);

        app.Button_14.BackgroundColor = [0.8 0.8 0.8];

        app.Button_14.Position = [503 151 89 62];
```

```
        app.Button_14.Text = '';

        % Create Button_15
        app.Button_15 = uibutton(app.UIFigure, 'push');
        app.Button_15.ButtonPushedFcn = createCallbackFcn(app,
@Button_15Pushed, true);
        app.Button_15.BackgroundColor = [0.8 0.8 0.8];
        app.Button_15.Position = [503 239 89 62];
        app.Button_15.Text = '';

        % Create Button_16
        app.Button_16 = uibutton(app.UIFigure, 'push');
        app.Button_16.ButtonPushedFcn = createCallbackFcn(app,
@Button_16Pushed, true);
        app.Button_16.BackgroundColor = [0.8 0.8 0.8];
        app.Button_16.Position = [503 61 89 62];
        app.Button_16.Text = '';

        % Create STARTButton
        app.STARTButton = uibutton(app.UIFigure, 'push');
        app.STARTButton.ButtonPushedFcn = createCallbackFcn(app,
@STARTButtonPushed, true);
        app.STARTButton.BackgroundColor = [0.3922 0.8314 0.0745];
        app.STARTButton.FontSize = 14;
        app.STARTButton.FontWeight = 'bold';
        app.STARTButton.Position = [114 8 100 25];
        app.STARTButton.Text = 'START';
```

```
        % Create GIVEUPButton
        app.GIVEUPButton = uibutton(app.UIFigure, 'push');
        app.GIVEUPButton.ButtonPushedFcn = createCallbackFcn(app,
@GIVEUPButtonPushed, true);
        app.GIVEUPButton.BackgroundColor = [0.0745 0.6235 1];
        app.GIVEUPButton.FontSize = 14;
        app.GIVEUPButton.FontWeight = 'bold';
        app.GIVEUPButton.Position = [387 8 100 25];
        app.GIVEUPButton.Text = 'GIVE UP';

        % Create SCOREEditFieldLabel
        app.SCOREEditFieldLabel = uilabel(app.UIFigure);
        app.SCOREEditFieldLabel.HorizontalAlignment = 'right';
        app.SCOREEditFieldLabel.FontSize = 14;
        app.SCOREEditFieldLabel.FontWeight = 'bold';
        app.SCOREEditFieldLabel.FontColor = [1 0 0];
        app.SCOREEditFieldLabel.Position = [17 419 55 22];
        app.SCOREEditFieldLabel.Text = 'SCORE';

        % Create SCOREEditField
        app.SCOREEditField = uieditfield(app.UIFigure, 'numeric');
        app.SCOREEditField.Position = [87 419 100 22];

        % Create TimeLabel
        app.TimeLabel = uilabel(app.UIFigure);
        app.TimeLabel.BackgroundColor = [0.3922 0.8314 0.0745];
        app.TimeLabel.FontSize = 36;
```

```
        app.TimeLabel.FontWeight = 'bold';
        app.TimeLabel.FontColor = [1 0 0];
        app.TimeLabel.Position = [387 407 235 52];
        app.TimeLabel.Text = 'Time';

        % Show the figure after all components are created
        app.UIFigure.Visible = 'on';
    end
end

% App creation and deletion
methods (Access = public)

    % Construct app
    function app = memory_puzzle

        % Create UIFigure and components
        createComponents(app)

        % Register the app with App Designer
        registerApp(app, app.UIFigure)

        if nargout == 0
            clear app
        end
    end
```

```
        % Code that executes before app deletion
        function delete(app)

            % Delete UIFigure when app is deleted
            delete(app.UIFigure)
        end
    end
end
```

For performing this experiment

1.Copy the code to MATLAB live script.

2. Now run the entire code.
