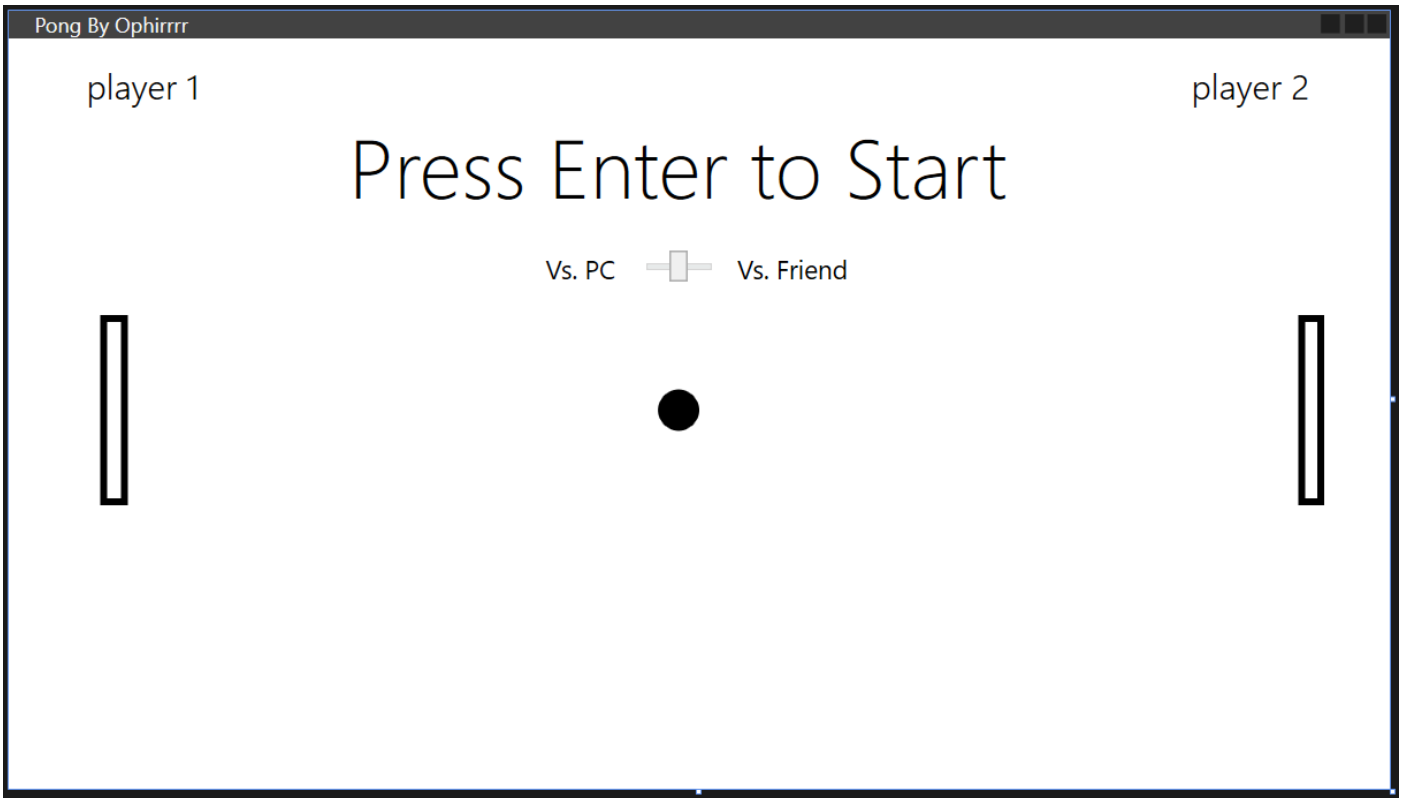
PONG

מיני פרויקט מבוסס WPF – אופיר הופמן י3



Xaml Code:

```
<Window
        xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
        xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
        xmlns:d="http://schemas.microsoft.com/expression/blend/2008"
        xmlns:mc="http://schemas.openxmlformats.org/markup-compatibility/2006"
        xmlns:local="clr-namespace:PongWPF"
        xmlns:Themes="clr-
namespace:Microsoft.Windows.Themes;assembly=PresentationFramework.AeroLite" x:Name="window"
x:Class="PongWPF.MainWindow"
        mc:Ignorable="d"
        Title="Pong By Ophirrrr" Height="450" Width="800" KeyDown="PlayerInput">
    <Grid Focusable="True" KeyDown="PlayerInput">
        <Grid.ColumnDefinitions>
            <ColumnDefinition Width="53*"/>
            <ColumnDefinition Width="747*"/>
        </Grid.ColumnDefinitions>
        <Rectangle x:Name="right_Tile" HorizontalAlignment="Left" Height="110"
Margin="694,160,0,0" Stroke="Black" VerticalAlignment="Top" Width="15" StrokeThickness="4"
Grid.Column="1"/>
        <Rectangle x:Name="left_Tile" HorizontalAlignment="Left" Height="110" Stroke="Black"
VerticalAlignment="Top" Width="16" StrokeThickness="4" Margin="0,160,0,0" Grid.Column="1"/>
        <Ellipse x:Name="ball" HorizontalAlignment="Left" Height="24" Stroke="Black"
VerticalAlignment="Top" Width="24" StrokeThickness="18" Margin="323,203,0,0" Grid.Column="1"/>
        <Label x:Name="WinLabel" Content="" HorizontalAlignment="Left" Height="76"
Margin="192,47,0,0" VerticalAlignment="Top" Width="310" FontSize="48" FontWeight="UltraLight"
Visibility="Hidden" Grid.Column="1"/>
        <Label x:Name="startLabel" Content="Press Enter to Start" HorizontalAlignment="Left"
Height="87" Margin="139,36,0,0" VerticalAlignment="Top" Width="392" FontSize="48"
FontWeight="UltraLight" Grid.Column="1"/>
        <Label x:Name="player1Lbl" Content="player 1" HorizontalAlignment="Left"
VerticalAlignment="Top" Height="38" Width="82" FontSize="20" Margin="40,9,0,0" FontFamily="Yu
Gothic UI Semilight" Grid.ColumnSpan="2"/>
```

```
        <Label x:Name="player2Lbl" Content="player 2" HorizontalAlignment="Left"
Margin="627,9,0,0" VerticalAlignment="Top" Height="38" Width="82" FontSize="20" FontFamily="Yu
Gothic UI Semilight" Grid.Column="1"/>
        <Rectangle x:Name="partition" Grid.Column="1" HorizontalAlignment="Left" Height="415"
Margin="332,8,0,0" Stroke="Black" VerticalAlignment="Top" Width="6" StrokeThickness="4"
Visibility="Hidden"/>
        <Slider x:Name="slider" Grid.Column="1" HorizontalAlignment="Left" Height="24"
Margin="311,123,0,0" VerticalAlignment="Top" Width="48" Value="5"
ValueChanged="slider_ValueChanged"/>
        <Label x:Name="vsPC" Grid.Column="1" Content="Vs. PC" HorizontalAlignment="Left"
Height="34" Margin="253,118,0,0" VerticalAlignment="Top" Width="53" FontSize="15"/>
        <Label x:Name="vsFriend" Grid.Column="1" Content="Vs. Friend"
HorizontalAlignment="Left" Height="34" Margin="364,118,0,0" VerticalAlignment="Top" Width="78"
FontSize="15"/>
    </Grid>
</Window>
```

Xaml.Cs

```
namespace PongWPF
{
    enum Direction { UpRight, DownRight, DownLeft, UpLeft};

    /// <summary>
    /// Interaction logic for MainWindow.xaml
    /// </summary>
    public partial class MainWindow : Window
    {
        private bool againstPC;
        private const int MinY = 5;
        private const int MaxY = 300;
        private const int MaxX = 795;
        private const int MinX = 5;
        private const int tile_Speed = 20;
        private const int ball_speed = 3;
        private Direction ball_direction;

        private int winner; // 1 - left, - right

        private DispatcherTimer mainTimer;



        Random rnd = new Random();

        public MainWindow()
        {

            InitializeComponent();

            // Timer Tick
            mainTimer = new DispatcherTimer();
            mainTimer.Interval = new TimeSpan(0, 0, 0, 0, 5);
            mainTimer.Tick += new EventHandler(mainTimer_Tick);

            ball_direction =  (Direction)rnd.Next(4);

        }

        private void mainTimer_Tick(object sender, EventArgs e)
        {
            MoveBall();
            if (againstPC)
                MoveLeftTilePC();
            CheckBallBorders();
            CheckTileHit();
            if (CheckWin())
            {
                mainTimer.Stop();
```

```
                ball.Visibility = Visibility.Hidden;
                partition.Visibility = Visibility.Hidden;
                WinLabel.Content = "Player " + winner + " Won!";
                WinLabel.Visibility = Visibility.Visible;

            }

        }

        private bool CheckWin()
        {
            if (ball.Margin.Left < left_Tile.Margin.Left)
            {
                winner = 2; // right player won
                return true;
            }

            if (ball.Margin.Left > right_Tile.Margin.Left + right_Tile.Width)
            {
                winner = 1; // left player won
                return true;
            }

            return false;
        }

        private void CheckTileHit()
        {
            double tileTop = left_Tile.Margin.Top;
            double tileBottom = left_Tile.Margin.Top + left_Tile.Height;
            double tileX = left_Tile.Margin.Left + left_Tile.Width;
            double ballTop = ball.Margin.Top;
            double ballBottom = ball.Margin.Top + ball.Height;
            double ballX = ball.Margin.Left;

            // Check Left Tile hit
            if (ballTop > tileTop && ballBottom < tileBottom && ballX < tileX+1)
            {
                ChangeBallDirection();
                return;
            }

            // Check right Tile hit
            tileTop = right_Tile.Margin.Top;
            tileBottom = right_Tile.Margin.Top + right_Tile.Height;
            tileX = right_Tile.Margin.Left;

            if (ballTop > tileTop && ballBottom < tileBottom && ballX > tileX - 25)
            {
                ChangeBallDirection();
            }
        }

        private void MoveBall()
        {
            if (ball_direction == Direction.UpRight)
                ball.Margin = new Thickness(ball.Margin.Left + ball_speed, ball.Margin.Top -
ball_speed, 0, 0);

            else if (ball_direction == Direction.DownRight)
                ball.Margin = new Thickness(ball.Margin.Left + ball_speed, ball.Margin.Top +
ball_speed, 0, 0);

            else if (ball_direction == Direction.DownLeft)
                ball.Margin = new Thickness(ball.Margin.Left - ball_speed, ball.Margin.Top +
ball_speed, 0, 0);

            else if (ball_direction == Direction.UpLeft)
```

```
                ball.Margin = new Thickness(ball.Margin.Left - ball_speed, ball.Margin.Top -
ball_speed, 0, 0);
        }



        private void CheckBallBorders()
        {
            if (BallReachedBorder())
            {
                ChangeBallDirection();
            }
        }

        private void ChangeBallDirection()
        {
            ball_direction = (Direction)((int)(ball_direction + 1) % 4);
        }

        private bool BallReachedBorder()
        {
            return ball.Margin.Top > 390 || ball.Margin.Top < 10;
        }

        private void MoveRightTile(System.Windows.Input.KeyEventArgs e)
        {
            // Right Tile Movement
            if (e.Key == Key.Up && right_Tile.Margin.Top > MinY)
                right_Tile.Margin = new Thickness(right_Tile.Margin.Left,
right_Tile.Margin.Top - tile_Speed, 0, 0);

            else if (e.Key == Key.Down && right_Tile.Margin.Top < MaxY)
                right_Tile.Margin = new Thickness(right_Tile.Margin.Left,
right_Tile.Margin.Top + tile_Speed, 0, 0);
        }

        private void MoveLeftTileUser(System.Windows.Input.KeyEventArgs e)
        {
            // Left Tile Movement
            if (e.Key == Key.W && left_Tile.Margin.Top > MinY)
                left_Tile.Margin = new Thickness(left_Tile.Margin.Left, left_Tile.Margin.Top -
tile_Speed, 0, 0);

            else if (e.Key == Key.S && left_Tile.Margin.Top < MaxY)
                left_Tile.Margin = new Thickness(left_Tile.Margin.Left, left_Tile.Margin.Top +
tile_Speed, 0, 0);
        }

        private void MoveLeftTilePC()
        {

            // Move left Tile accordingly to the ball Y position

            double ballTop = ball.Margin.Top;
            double ballBottom = ball.Margin.Top + ball.Height;

            double tileTop = left_Tile.Margin.Top;
            double tileBottom = left_Tile.Margin.Top + left_Tile.Height;

            if (ballTop < tileTop && ((int)ball_direction == 3 || (int)ball_direction == 2))
                left_Tile.Margin = new Thickness(left_Tile.Margin.Left, left_Tile.Margin.Top -
tile_Speed, 0, 0);

            else if (ballBottom > tileBottom && ((int)ball_direction == 3 ||
(int)ball_direction == 2))
                left_Tile.Margin = new Thickness(left_Tile.Margin.Left, left_Tile.Margin.Top +
tile_Speed, 0, 0);
        }
```

```
        private void PlayerInput(object sender, System.Windows.Input.KeyEventArgs e)
        {
            MoveRightTile(e); // Check right tile movement

            if (!againstPC) // Only if not against PC
                MoveLeftTileUser(e); // Check left tile movement

            // Start Game
            if (e.Key == Key.Enter)
            {
                mainTimer.Start();
                slider.Visibility = Visibility.Hidden;
                vsFriend.Visibility = Visibility.Hidden;
                vsPC.Visibility = Visibility.Hidden;
                startLabel.Visibility = Visibility.Hidden;
                partition.Visibility = Visibility.Visible;

            }

            // End Game & exit window
            else if (e.Key == Key.Escape)
            {
                mainTimer.Stop();
                window.Close();
            }

        }

        public void Slider_ValueChanged(object sender, RoutedPropertyChangedEventArgs<double>
e)
        {
            // Check if player wants to play against PC ("AI") or Friend (W, S)

            if (slider.Value == 10) // Against a friend
            {
                againstPC = false;
                vsFriend.FontWeight = FontWeights.Bold;
                vsPC.FontWeight = FontWeights.Normal;

            }

            else if (slider.Value == 0) // Against PC
            {
                againstPC = true;
                vsPC.FontWeight = FontWeights.Bold;
                vsFriend.FontWeight = FontWeights.Normal;
            }
        }
    }
}
```