

# ANEXO B

En este anexo incluye el código desarrollado en Matlab para “AppDesigner”.



```

classdef app1 < matlab.apps.AppBase

% Properties that correspond to app components
properties (Access = public)

UIFigure matlab.ui.Figure

PIANODASHBOARDLabel matlab.ui.control.Label

Label matlab.ui.control.Label

ConnectButton srealttime.ui.control.ConnectButton

ButtonGroup matlab.ui.container.ButtonGroup

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 matlab.ui.control.Button

SIButton matlab.ui.control.ToggleButton

LAButton matlab.ui.control.ToggleButton

SOLButton matlab.ui.control.ToggleButton

REButton matlab.ui.control.ToggleButton

MIButton matlab.ui.control.ToggleButton

FAButton matlab.ui.control.ToggleButton

DOButton matlab.ui.control.ToggleButton

PartituraButton matlab.ui.control.Button

NotasAletaroriasButton matlab.ui.control.Button

EscalaDescendenteButton matlab.ui.control.Button

EscalaAscendenteButton matlab.ui.control.Button

DancingRobotButton matlab.ui.control.Button

Robot2Button matlab.ui.control.Button

Robot1Button matlab.ui.control.Button

end

properties (Access = private)

daobj1 % Description objeto OPC

grp1 % Grupo OPC

```

```

stop1 % Variable: Fin de programa

itmNotaPulsada1 % Variable: notaPulsada

itmOpcion1 % Variable: opcion

itmDosNotas1 % Variable: Dos_Notas

itmActiveRobot1 % Variable: ActiveRobot1

itmNosalir1 % Variable: nosalir

itmNotaATocar1 % Variable: Nota_a_tocar

itmNotaPulsada2 % Variable: notaPulsada

itmOpcion2 % Variable: opcion

itmDosNotas2 % Variable: Dos_Notas

itmNosalir2 % Variable: nosalir

itmActiveRobot2 % Variable: ActiveRobot2

DI_DanceON

DI_NumNotas

DI_Rob1

DI_Rob2

DI_DO

DI_RE

DI_MI

DI_FA

DI_SOL

DI_LA

DI_SI

value

position

updateTimer

end

% Callbacks that handle component events

methods (Access = private)

% Code that executes after component creation

function ConnectRobots(app)

```

```

try

% Crear el objeto OPCDA

app.daobj1 = opcda('localhost', 'ABB.IRC5.OPC.Server.DA');

connect(app.daobj1);

% Crear grupo OPC

app.grp1 = addgroup(app.daobj1, 'GRP06663090');

set(app.grp1, 'LogFileName', 'opcdata.log.olf');

% Crear los objetos Item para las variables RAPID

%T_ROB1

app.itmNotaPulsada1 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB1.ModulePiano.notaPulsada',
'single');

app.itmOpcion1 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB1.ModulePiano.opcion', 'single');

app.itmDosNotas1 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB1.ModulePiano.Dos_Notas',
'single');

app.itmActiveRobot1 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB1.ModulePiano.ActiveRobot1',
'single');

app.itmNosalir1 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB1.ModulePiano.nosalir', 'single');

app.itmNotaATocar1 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB1.ModulePiano.Nota_a_tocar',
'single');

%T_ROB2

app.itmNotaPulsada2 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB2.ModulePiano.notaPulsada',
'single');

app.itmOpcion2 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB2.ModulePiano.opcion', 'single');

app.itmDosNotas2 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB2.ModulePiano.Dos_Notas',
'single');

app.itmNosalir2 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB2.ModulePiano.nosalir', 'single');

```

```

app.itmActiveRobot2 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB2.ModulePiano.ActiveRobot2',
'single');

app.itmNotaATocar2 = additem(app.grp1, 'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.RAPID.T_ROB2.ModulePiano.Nota_a_tocar',
'single');

%Crear los objetos Item para las señales del Controlador del YUMI

app.DI_DanceON = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador3.IOSYSTEM.IOSIGNALS.DI_0_ON', 'logical');

app.DI_DO = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador3.IOSYSTEM.IOSIGNALS.DI_1_DO', 'logical');

app.DI_RE = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador3.IOSYSTEM.IOSIGNALS.DI_2_RE', 'logical');

app.DI_MI = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador3.IOSYSTEM.IOSIGNALS.DI_3_MI', 'logical');

app.DI_FA = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador3.IOSYSTEM.IOSIGNALS.DI_4_FA', 'logical');

app.DI_SOL = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador3.IOSYSTEM.IOSIGNALS.DI_5_SOL', 'logical');

app.DI_LA = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador3.IOSYSTEM.IOSIGNALS.DI_6_LA', 'logical');

app.DI_SI = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador3.IOSYSTEM.IOSIGNALS.DI_7_SI', 'logical');

% Crear los objetos Item para las señales del

% ControladorIRB120

%app.DI_DanceON = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.IOSIGNALS.DI_8_DanceON', 'logical');

app.DI_NumNotas = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.IOSYSTEM.IOSIGNALS.DI_13_NumN', 'logical');

app.DI_Rob1 = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.IOSYSTEM.IOSIGNALS.DO_2_ActiveRobot1'); %,
'double');

app.DI_Rob2 = additem(app.grp1,'DESKTOP-
2GR20GE_Controlador_Robots_IRB120.IOSYSTEM.IOSIGNALS.DI_14_Rob2', 'double');

% Actualizar el estado del botón de conexión

app.ConnectButton.Text = 'Conectado';

app.ConnectButton.BackgroundColor = [0.2, 0.8, 0.2]; % Verde

```

```

fprintf('Conexión establecida con el servidor OPC.\n');

catch

uiaalert(app.UIFigure, 'Error conectando a los robots.', 'Error');

end

end

% Callback function

function DosNotasButtonPushed(app, event)

write(app.DI_NumNotas, true); % Dos notas, Intervalos

fprintf('Modo intervalos activado. \n');

end

% Callback function

function UnaNotaButtonPushed(app, event)

write(app.DI_NumNotas, false); % Nota unica

fprintf('Modo intervalos desactivado. \n');

end

% Button pushed function: PartituraButton

function PartituraButtonPushed(app, event)

write(app.itmOpcion1, 3); % Opción 6: Leer Partitura

fprintf('Modo de lectura de partitura activado.\n');

end

% Button pushed function: NotasAletaroriasButton

function NotasAletaroriasButtonPushed(app, event)

write(app.itmOpcion1, 4); % Opción 1: Notas Aleatorias

fprintf('Notas aleatorias activadas.\n');

end

% Button pushed function: EscalaDescendenteButton

function EscalaDescendenteButtonPushed(app, event)

write(app.itmOpcion1, 2); % Opción 3: Escala Descendente

fprintf('Escala descendente activada.\n');

end

% Button pushed function: EscalaAscendenteButton

```

```

function EscalaAscendenteButtonPushed(app, event)
write(app.itmOpcion1, 1); % Opción 2: Escala Ascendente
fprintf('Escala ascendente activada.\n');
end

% Button pushed function: DancingRobotButton
function DancingRobotButtonPushed(app, event)
write(app.DI_DanceON, 1);
fprintf('Robot Dancing\n');
end

% Button pushed function: Robot2Button
function Robot2ButtonPushed(app, event)
write(app.itmActiveRobot2, 1);
fprintf('Robot 2 activado.\n');
end

% Button pushed function: Robot1Button
function Robot1ButtonPushed(app, event)
write(app.itmActiveRobot1, 1);
fprintf('Robot 1 activado.\n');
end

% Callback function: ConnectButton
function ConnectButtonSizeChanged(app, event)
app.position = app.ConnectButton.Position;
end

% Callback function
function SwitchValueChanged(app, event)
app.value = app.Switch.Value;
if(strcmp(app.value, 'On'))
write(app.itmActiveRobot1, true);
else
write(app.itmActiveRobot1, false);
end
end

```



```

end

% Callback function
function Switch2ValueChanged(app, event)
app.value = app.Switch2.Value;
if(strcmp(app.value, 'On'))
app.itmActiveRobot2 = true;
else
app.itmActiveRobot2 = false;
end
end

% Callback function
function Switch3ValueChanged(app, event)
app.value = app.Switch3.Value;
end

% Button down function: ButtonGroup
function ButtonGroupButtonDown(app, event)
end

% Size changed function: ButtonGroup
function ButtonGroupSizeChanged(app, event)
%position = app.ButtonGroup.Position;
write(app.itmOpcion, 5); % Opción 5. Notas a Tocar
% Get the selected button
selectedButton = app.ButtonGroup.SelectedObject;
% Get the text of the selected button
note = selectedButton.Text;
% Map the text to specific actions
switch note
case 'DO'
writeValue(app.itmNotaATocar, 1); % DO
disp('DO button pressed');
case 'RE'

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writeValue(app.itmNotaATocar, 2); % RE
disp('RE button pressed');
case 'MI'
writeValue(app.itmNotaATocar, 3); % MI
disp('MI button pressed');
case 'FA'
writeValue(app.itmNotaATocar, 4); % FA
disp('FA button pressed');
case 'SOL'
writeValue(app.itmNotaATocar, 5); % SOL
disp('SOL button pressed');
case 'LA'
writeValue(app.itmNotaATocar, 6); % LA
disp('LA button pressed');
case 'SI'
writeValue(app.itmNotaATocar, 7); % SI
disp('SI button pressed');
otherwise
disp('Unknown button pressed');
end
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 = [0.651 0.651 0.651];
app.UIFigure.Position = [100 100 635 490];
app.UIFigure.Name = 'MATLAB App';

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app.UIFigure.WindowStyle = 'modal';

% Create Robot1Button

app.Robot1Button = uibutton(app.UIFigure, 'push');

app.Robot1Button.ButtonPushedFcn = createCallbackFcn(app, @Robot1ButtonPushed,
true);

app.Robot1Button.BackgroundColor = [1 1 0];

app.Robot1Button.FontSize = 18;

app.Robot1Button.FontWeight = 'bold';

app.Robot1Button.Position = [26 50 170 47];

app.Robot1Button.Text = 'Robot1';

% Create Robot2Button

app.Robot2Button = uibutton(app.UIFigure, 'push');

app.Robot2Button.ButtonPushedFcn = createCallbackFcn(app, @Robot2ButtonPushed,
true);

app.Robot2Button.BackgroundColor = [1 1 0];

app.Robot2Button.FontSize = 18;

app.Robot2Button.FontWeight = 'bold';

app.Robot2Button.Position = [241 50 162 47];

app.Robot2Button.Text = 'Robot2';

% Create DancingRobotButton

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

app.DancingRobotButton.ButtonPushedFcn = createCallbackFcn(app,
@DancingRobotButtonPushed, true);

app.DancingRobotButton.BackgroundColor = [0.9294 0.6941 0.1255];

app.DancingRobotButton.FontSize = 18;

app.DancingRobotButton.FontWeight = 'bold';

app.DancingRobotButton.Position = [419 168 168 62];

app.DancingRobotButton.Text = 'Dancing Robot';

% Create EscalaAscendenteButton

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

app.EscalaAscendenteButton.ButtonPushedFcn = createCallbackFcn(app,
@EscalaAscendenteButtonPushed, true);

```

```

app.EscalaAscendenteButton.BackgroundColor = [0.9412 0.9412 0.9412];
app.EscalaAscendenteButton.FontSize = 14;
app.EscalaAscendenteButton.FontWeight = 'bold';
app.EscalaAscendenteButton.Position = [20 364 141 61];
app.EscalaAscendenteButton.Text = 'Escala Ascendente';

% Create EscalaDescendenteButton
app.EscalaDescendenteButton = uibutton(app.UIFigure, 'push');
app.EscalaDescendenteButton.ButtonPushedFcn = createCallbackFcn(app,
@EscalaDescendenteButtonPushed, true);
app.EscalaDescendenteButton.BackgroundColor = [0.9412 0.9412 0.9412];
app.EscalaDescendenteButton.FontSize = 14;
app.EscalaDescendenteButton.FontWeight = 'bold';
app.EscalaDescendenteButton.Position = [170 364 156 61];
app.EscalaDescendenteButton.Text = 'Escala Descendente';

% Create NotasAletaroriasButton
app.NotasAletaroriasButton = uibutton(app.UIFigure, 'push');
app.NotasAletaroriasButton.ButtonPushedFcn = createCallbackFcn(app,
@NotasAletaroriasButtonPushed, true);
app.NotasAletaroriasButton.BackgroundColor = [0.9412 0.9412 0.9412];
app.NotasAletaroriasButton.FontSize = 14;
app.NotasAletaroriasButton.FontWeight = 'bold';
app.NotasAletaroriasButton.Position = [478 364 138 61];
app.NotasAletaroriasButton.Text = 'Notas Aletarorias';

% Create PartituraButton
app.PartituraButton = uibutton(app.UIFigure, 'push');
app.PartituraButton.ButtonPushedFcn = createCallbackFcn(app,
@PartituraButtonPushed, true);
app.PartituraButton.BackgroundColor = [0.902 0.902 0.902];
app.PartituraButton.FontSize = 14;
app.PartituraButton.FontWeight = 'bold';
app.PartituraButton.Position = [339 364 128 61];
app.PartituraButton.Text = 'Partitura';

```

```

% Create ButtonGroup

app.ButtonGroup = uibuttongroup(app.UIFigure);

app.ButtonGroup.BorderColor = [0 0 0];

app.ButtonGroup.BackgroundColor = [0 0 0];

app.ButtonGroup.SizeChangedFcn = createCallbackFcn(app,
@ButtonGroupSizeChanged, true);

app.ButtonGroup.ButtonDownFcn = createCallbackFcn(app,
@ButtonGroupButtonDown, true);

app.ButtonGroup.Position = [61 135 302 197];

% Create DOButton

app.DOButton = uitogglebutton(app.ButtonGroup);

app.DOButton.Interruptible = 'off';

app.DOButton.Text = 'DO';

app.DOButton.BackgroundColor = [1 1 1];

app.DOButton.Position = [15 10 37 177];

app.DOButton.Value = true;

% Create FAButton

app.FAButton = uitogglebutton(app.ButtonGroup);

app.FAButton.Text = 'FA';

app.FAButton.BackgroundColor = [1 1 1];

app.FAButton.Position = [126 10 41 177];

% Create MIButton

app.MIButton = uitogglebutton(app.ButtonGroup);

app.MIButton.Text = 'MI';

app.MIButton.BackgroundColor = [1 1 1];

app.MIButton.Position = [89 10 37 177];

% Create REButton

app.REButton = uitogglebutton(app.ButtonGroup);

app.REButton.Text = 'RE';

app.REButton.BackgroundColor = [1 1 1];

app.REButton.Position = [52 10 37 177];

% Create SOLButton

```

```
app.SOLButton = uitogglebutton(app.ButtonGroup);
app.SOLButton.Text = 'SOL';
app.SOLButton.BackgroundColor = [1 1 1];
app.SOLButton.Position = [167 10 37 177];
% Create LAButton
app.LAButton = uitogglebutton(app.ButtonGroup);
app.LAButton.Text = 'LA';
app.LAButton.BackgroundColor = [1 1 1];
app.LAButton.Position = [204 10 37 177];
% Create SIButton
app.SIButton = uitogglebutton(app.ButtonGroup);
app.SIButton.Text = 'SI';
app.SIButton.BackgroundColor = [1 1 1];
app.SIButton.Position = [241 10 38 177];
% Create Button
app.Button = uibutton(app.ButtonGroup, 'push');
app.Button.BackgroundColor = [0 0 0];
app.Button.Position = [38 112 23 75];
% Create Button_2
app.Button_2 = uibutton(app.ButtonGroup, 'push');
app.Button_2.BackgroundColor = [0 0 0];
app.Button_2.Position = [75 112 24 75];
% Create Button_3
app.Button_3 = uibutton(app.ButtonGroup, 'push');
app.Button_3.BackgroundColor = [0 0 0];
app.Button_3.Position = [157 112 24 75];
% Create Button_4
app.Button_4 = uibutton(app.ButtonGroup, 'push');
app.Button_4.BackgroundColor = [0 0 0];
app.Button_4.Position = [193 112 25 75];
% Create Button_5
```

```

app.Button_5 = uibutton(app.ButtonGroup, 'push');
app.Button_5.BackgroundColor = [0 0 0];
app.Button_5.Position = [232 112 24 75];
% Create ConnectButton
app.ConnectButton = srealttime.ui.control.ConnectButton(app.UIFigure);
app.ConnectButton.FontSize = 14;
app.ConnectButton.FontWeight = 'bold';
app.ConnectButton.BackgroundColor = [0.4667 0.6745 0.1882];
app.ConnectButton.SizeChangedFcn = createCallbackFcn(app,
@ConnectButtonSizeChanged, true);
app.ConnectButton.Position = [449 267 107 34];
% Create Label
app.Label = uilabel(app.UIFigure);
app.Label.Position = [198 452 268 29];
app.Label.Text = '';
% Create PIANODASHBOARDLabel
app.PIANODASHBOARDLabel = uilabel(app.UIFigure);
app.PIANODASHBOARDLabel.FontSize = 24;
app.PIANODASHBOARDLabel.Position = [212 434 238 47];
app.PIANODASHBOARDLabel.Text = 'PIANO DASHBOARD';
% 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 = app1
% Create UIFigure and components
createComponents(app)
% Register the app with App Designer

```

```
registerApp(app, app.UIFigure)

% Execute the startup function
runStartupFcn(app, @ConnectRobots)

if nargin == 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
```