



Lab1: Simple Stimulus



Lab 1: Simple Stimulus

- **Objective: Using simple stimulus w/ simulator**
 - Asynchronous Stimulus
 - Pin/Register Action Stimulus
- **Open MPLAB IDE**
 - Double-click MPLAB icon on desktop
- **Bring up Lab 1 workspace**
 - Select menu item "File>Open Workspace..."
 - Choose "c:\masters\11014\Lab1\Lab1.mcw"
 - Select menu "Project>Make" to make the project



Lab 1: Simple Stimulus

- **Bring up the Stopwatch window**
 - Select menu item “Debugger>Stopwatch”
- **Bring up the watch window**
 - Select menu item “View>Watch”
 - In the “Add SFR” dropdown box, select PORTA, then click the “Add SFR” button
 - Add TMR0 and PORTB in a similar manner
- **Set the animation speed to 500 ms**
 - Select menu item “Debugger>Settings”
 - Choose “Animation/Realtime Update” tab
 - Set Animation step time to 500 msec. Click OK.



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- **Open Stimulus Window: Add Asynchronous Stimulus to TOCKI**
 - Select “Debugger>Stimulus>New Workbook”
 - Click on the last tab that says “Asynch”
 - In the grid, add the following 2 stimuli:

Fire	Pin / SFR	Action	Width	Units	Comments / Message
>	RA0	Toggle			
>	TOCKI	Pulse High		3 cyc	

- Leave the Stimulus window open
- Hint: Do not let Stimulus Window cover Output Window and the editor window



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- **Test the Asynchronous Stimulus to RA0**
 - Click “Reset”  on the debug toolbar
 - Click “Animate”  on the toolbar
 - Click the “Fire” button for the RA0 stimulus during simulation and see PORTA changes in the watch
- **Test the Asynchronous Stimulus to T0CKI**
 - Continue the animation
 - Click the “Fire” button for the T0CKI stimulus during simulation, observe change in PORTA and TMR0
 - If necessary, fire T0CKI again and observe again
 - **Question**: Can you explain what has happened?
 - Click “Halt”  to stop the simulation



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- **Add Synchronous Stimulus**
 - Select the stimulus window
 - Select the “Pin/Register Action” tab at the top
 - Select “cyc” from the Time Unit dropdown
 - Make sure the “Repeat” checkbox is unchecked
 - Click on the “Click here to add signals” area on the title bar of the table to bring up “Add/Remove Pin/Register” window
 - Scroll to middle of the long list of signals on the left, select PORTB, then click the “Add =>” button to add it to our select list
 - Click OK to close “Add/Remove Pin/Register” window



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- **Add Stimulus data for PORTB**
 - Enter data to the table as shown below




Time	PORTB
(dec)	(hex)
10	00
20	AA
30	BB



- Click on the “Apply” button at the bottom
- Output window should say: “Synchronous stimulus applied successfully.”
- Leave the Stimulus window opened






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- **Testing the Synchronous Stimulus to PORTB**
 - Pay attention to stopwatch, output, & watch windows
 - Click “Reset”  then “Animate” 
 - **Question:** Does PORTB changes @ cycle 10, 20, 30?
 - Click “Halt”  to stop the simulation






Lab 1: Simple Stimulus

- **“Repeat” stimulus**
 - We will modify our stimulus slightly
 - Go to the “Pin/Register Action” tab (1st tab)
 - Check the “Repeat” box
 - Enter a “after” value of 10, leave “Restart at” blank
 - Click on the “Apply” button (**VERY IMPORTANT**)
- **Testing the “Repeat” stimulus**
 - Click “Reset”  then “Animate” 
 - Watch the stopwatch and watch windows as it runs
 - Take note when PORTB changes (after cycle 30)
 - Click “Halt”  to stop the simulation



Lab 1: Simple Stimulus

- **“Repeat” some stimuli**
 - Have the “Repeat” box checked and after = 10 cycles
 - Select 20 from the “Restart at” dropdown box
 - Click on the “Apply” button (**VERY IMPORTANT**)
- **Testing the “Repeat” stimulus**
 - Click “Reset”  then “Animate” 
 - Watch the stopwatch and watch windows as it runs
 - Take note when PORTB changes (after cycle 30)
 - PORTB should change like 00 – AA – BB – AA – BB
 - Click “Halt”  to stop the simulation



Lab 1: Simple Stimulus

- **Close Workspace**
 - Select “*File>Close Workspace*”
 - Save everything if being asked