**ELEC 374 – Digital Systems Engineering**

**Phase 3 Report**

**Group 18**

**Divaydeep Singh 20143859**

**Lucas Austin 20061953**

**Code**

Ctrl\_unit.v

Chart, scatter chart

Description automatically generated  
A picture containing text

Description automatically generated  
A picture containing graphical user interface

Description automatically generated  
Graphical user interface

Description automatically generated with low confidence  
Graphical user interface

Description automatically generated with low confidence  
A picture containing background pattern

Description automatically generated  
Graphical user interface, text, application

Description automatically generated  
Shape

Description automatically generated  
Graphical user interface, application

Description automatically generated with medium confidence  
Shape

Description automatically generated with medium confidence  
A picture containing background pattern

Description automatically generated  
Background pattern

Description automatically generated with low confidence  
A picture containing background pattern

Description automatically generated  
Background pattern

Description automatically generated with low confidence  
Graphical user interface

Description automatically generated with low confidence  
Graphical user interface

Description automatically generated with low confidence  
Graphical user interface, application

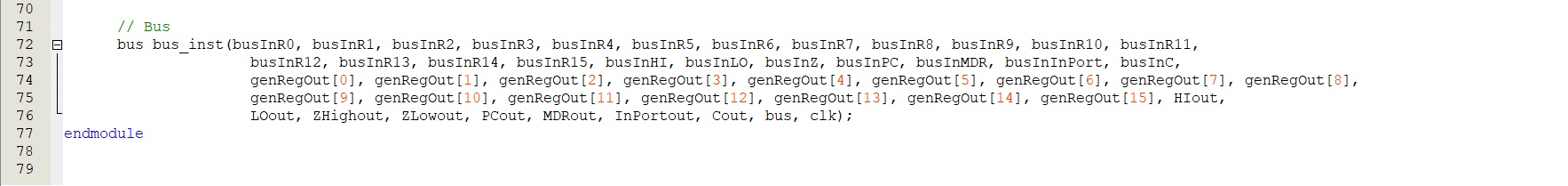
Description automatically generated  
Graphical user interface

Description automatically generated with medium confidence

main1.v

Graphical user interface, text, application

Description automatically generated  
Text

Description automatically generated  


pc\_reg.v

Graphical user interface, text, application

Description automatically generated

memSubsys.v

Text

Description automatically generated with low confidence

datapath\_tb.v

Text

Description automatically generated with medium confidence  
A picture containing text

Description automatically generated  
Text

Description automatically generated  
Text

Description automatically generated  
Text

Description automatically generated  


**Functional Simulations**

Instructions 0-15

Timeline

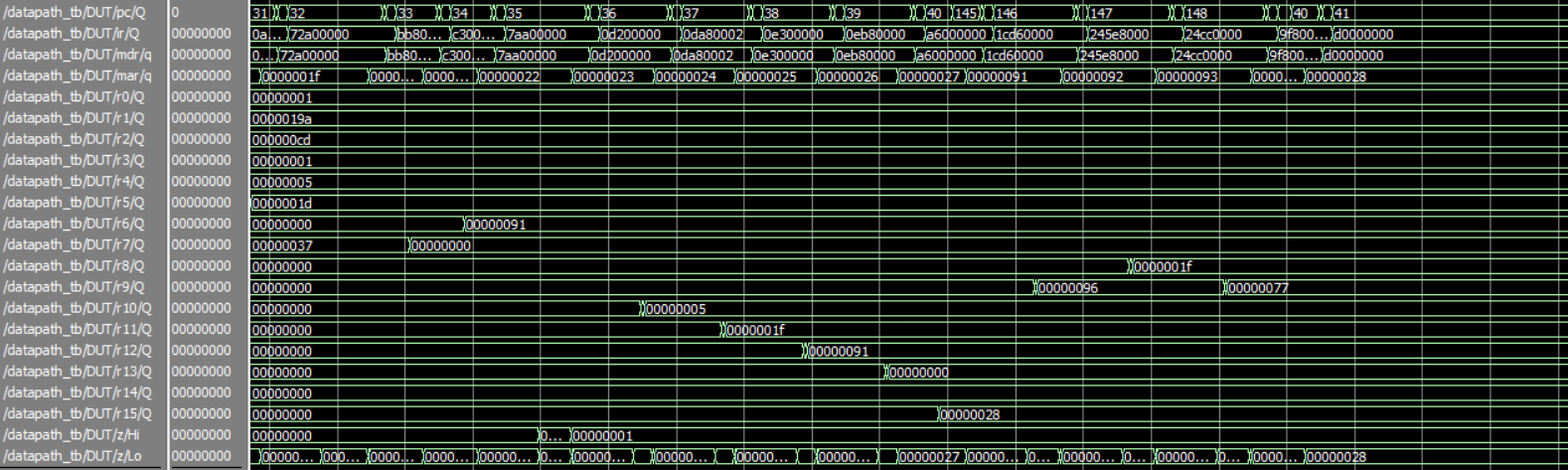
Description automatically generated

Instructions 16-31

Schematic

Description automatically generated with low confidence

Instructions 32-end



\*jal R12 puts return address in R15, not R14 as suggested by mistake in comments of instructions

\*\*sub R9, R9, R8 puts $77 in R9 not R13 as suggested by mistake in comments of instructions

**State of memory**

Memory before run

Background pattern

Description automatically generated

Memory after run

Background pattern

Description automatically generated

Memory before run (Hex)

Calendar

Description automatically generated

Memory after run (Hex)

Calendar

Description automatically generated

\*st $67(R1), R2 puts $CD in address $6F, not $75 as suggested by mistake in comments of instructions, since $67 + $8 = $6F, not $75