2021–2022 FALL SEMESTER

CS223 – PROJECT

SIMPLE PROCESSOR

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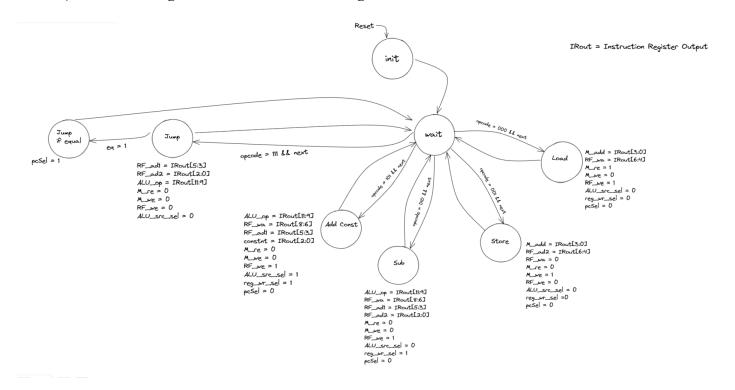
ID : 22001296

COURSE:CS223 – DIGTAL DESGIN
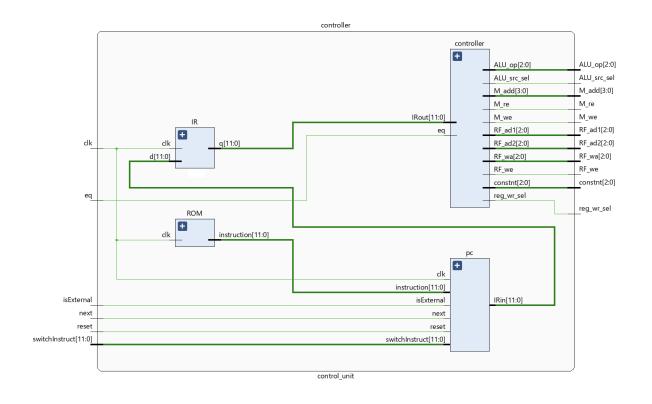
SECTION: 01

DATE: 11/12/2021

b) Controller High-Level State Machine Diagram

IRout = Instruction Register Output

init

Reset

wait

opcode = 000 && next

Load
M_add = IRout[3:0]
RF_wa = IRout[6:4]
M_re = 1
M_we = 0
RF_we = 1
ALU_src_sel = 0
reg_wr_sel = 0
pcSel = 0

Jump if equal
pcSel = 1

eq = 1

Jump
RF_ad1 = IRout[5:3]
RF_ad2 = IRout[2:0]
ALU_op = IRout[11:9]
M_re = 0
M_we = 0
RF_we = 0
ALU_src_sel = 0

opcode = 111 && next

Add Const
ALU_op = IRout[11:9]
RF_wa = IRout[8:6]
RF_ad1 = IRout[5:3]
constnt = IRout[2:0]
M_re = 0
M_we = 0
RF_we = 1
ALU_src_sel = 1
reg_wr_sel = 1
pcSel = 0

opcode = 101 && next

opcode = 100 && next

Sub
ALU_op = IRout[11:9]
RF_wa = IRout[8:6]
RF_ad1 = IRout[5:3]
RF_ad2 = IRout[2:0]
M_re = 0
M_we = 0
RF_we = 1
ALU_src_sel = 0
reg_wr_sel = 1
pcSel = 0

opcode = 001 && next

Store
M_add = IRout[3:0]
RF_ad2 = IRout[6:4]
RF_wa = 0
M_re = 0
M_we = 1
RF_we = 0
ALU_src_sel = 0
reg_wr_sel = 0
pcSel = 0

c)Controller Block Diagram

d) Controller/Datapath Top Module Block Diagram