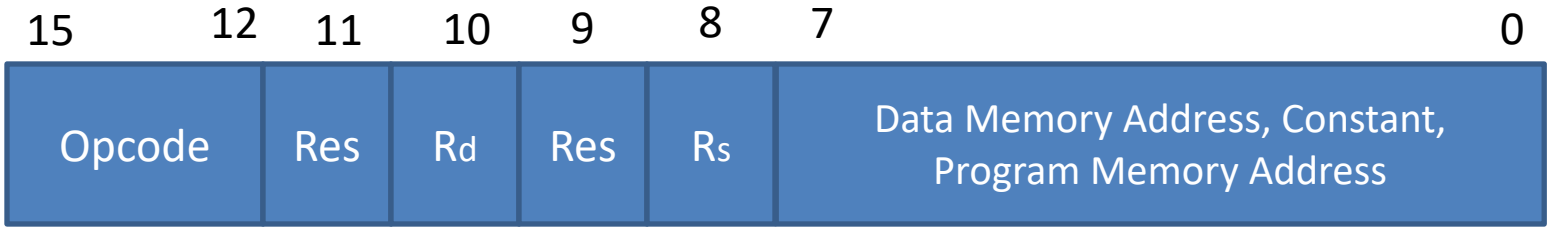
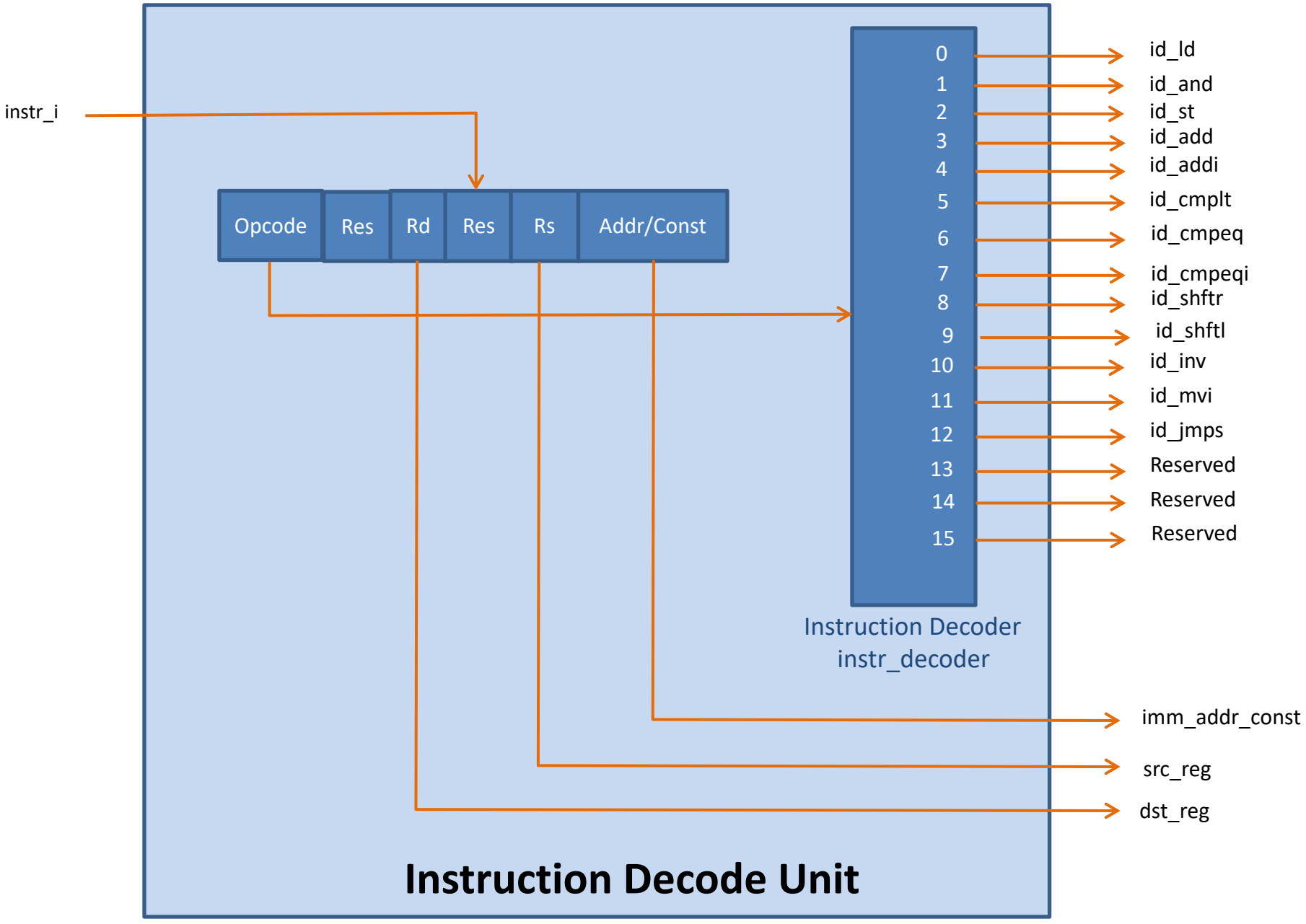
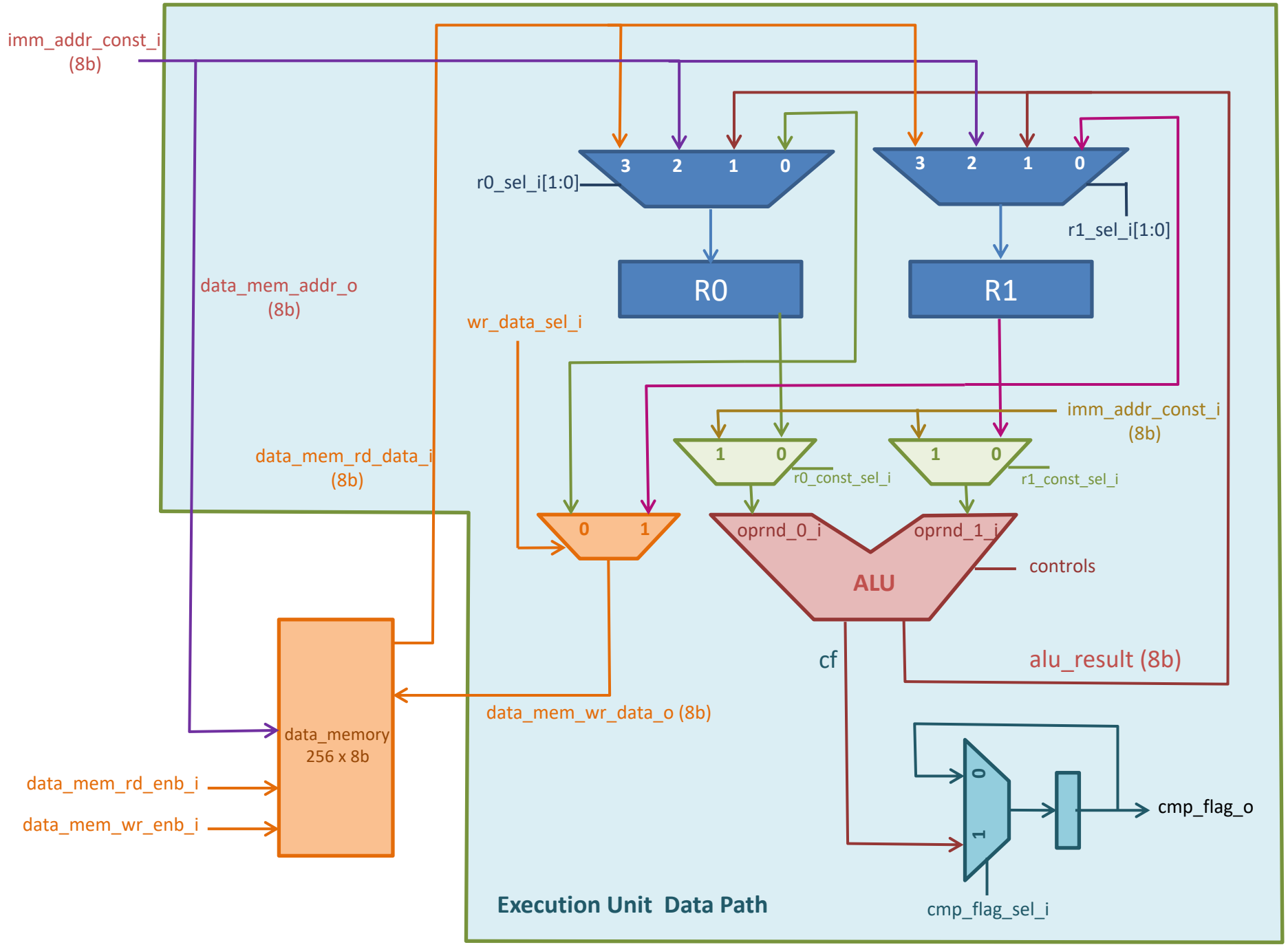
8-bit Processor

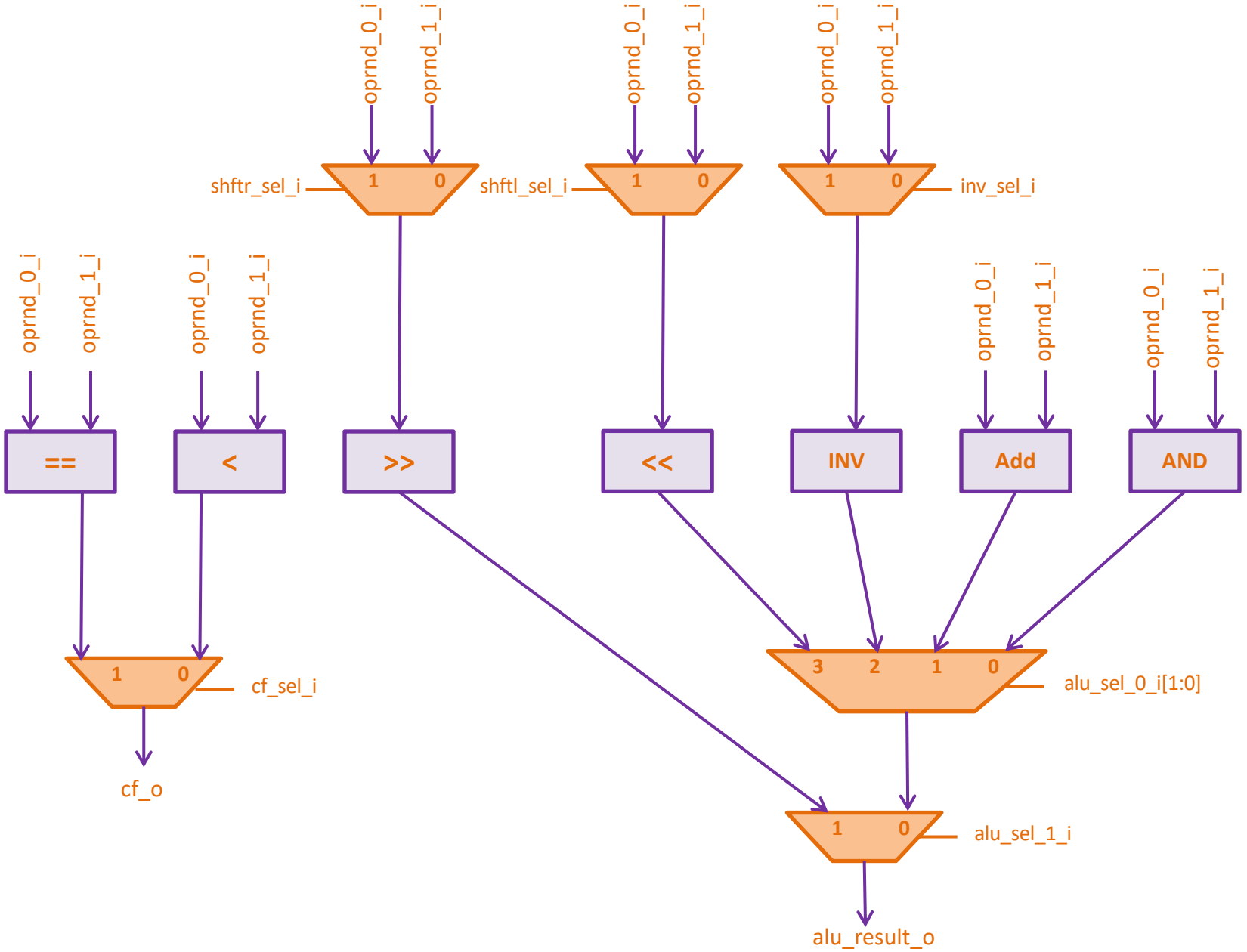
Johar Samrao



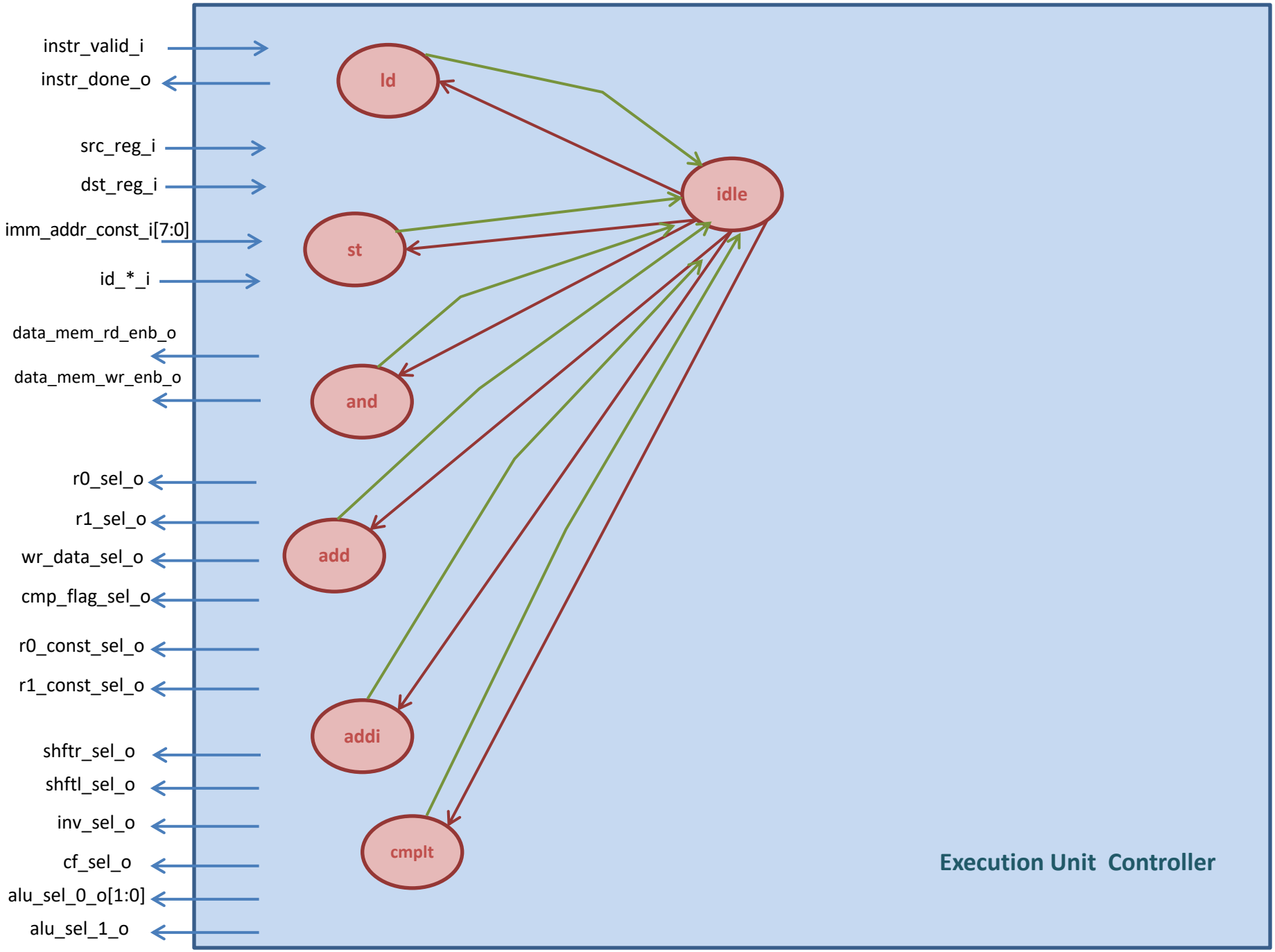
Instruction Format


instr_i
Opcode
Res
Rd
Res
Rs
Addr/Const
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
id_ld
id_and
id_st
id_add
id_addi
id_cmplt
id_cmpeq
id_cmpeqi
id_shftr
id_shftl
id_inv
id_mvi
id_jmps
Reserved
Reserved
Reserved
Instruction Decoder
instr_decoder
imm_addr_const
src_reg
dst_reg
Instruction Decode Unit


imm_addr_const_i
(8b)
3
2
1
0
r0_sel_i[1:0]
r1_sel_i[1:0]
R0
R1
data_mem_addr_o
(8b)
wr_data_sel_i
imm_addr_const_i
(8b)
data_mem_rd_data_i
(8b)
1
0
r0_const_sel_i
r1_const_sel_i
0
1
oprnd_0_i
oprnd_1_i
ALU
controls
cf
alu_result (8b)
data_mem_wr_data_o (8b)
data_memory
256 x 8b
data_mem_rd_enb_i
data_mem_wr_enb_i
cmp_flag_o
cmp_flag_sel_i
Execution Unit Data Path



Arithmetic and Logic Unit (ALU)


instr_valid_i
instr_done_o
src_reg_i
dst_reg_i
imm_addr_const_i[7:0]
id_*_i
data_mem_rd_enb_o
data_mem_wr_enb_o
r0_sel_o
r1_sel_o
wr_data_sel_o
cmp_flag_sel_o
r0_const_sel_o
r1_const_sel_o
shftr_sel_o
shftl_sel_o
inv_sel_o
cf_sel_o
alu_sel_0_o[1:0]
alu_sel_1_o
ld
idle
st
and
add
addi
cmplt
Execution Unit Controller