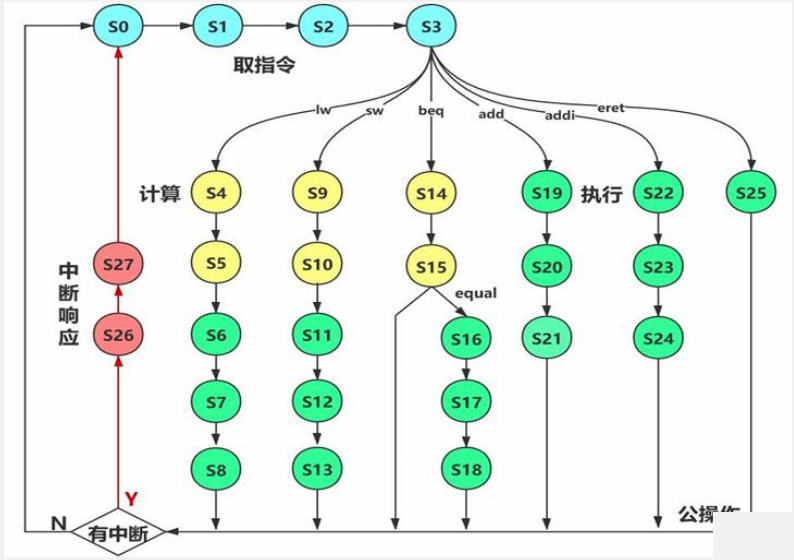
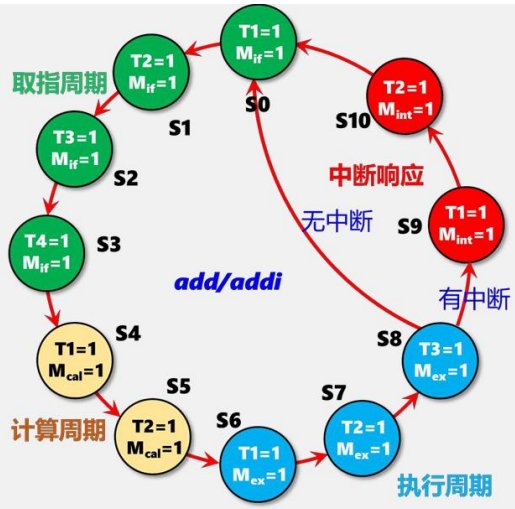
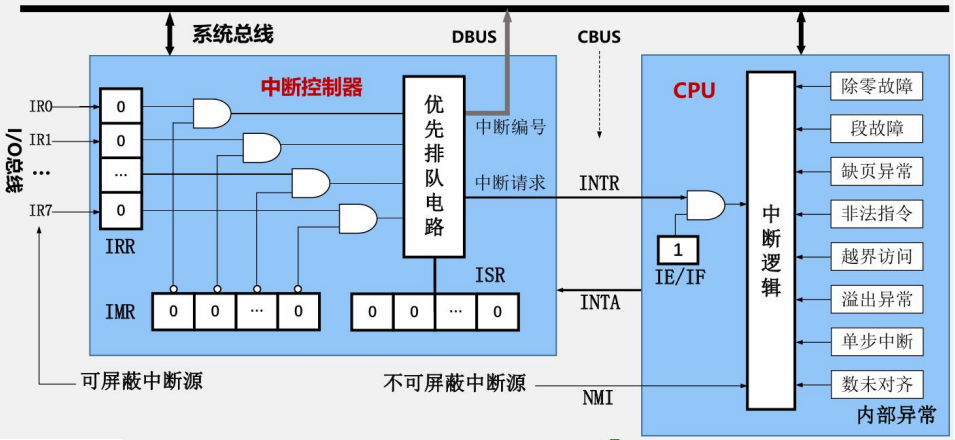


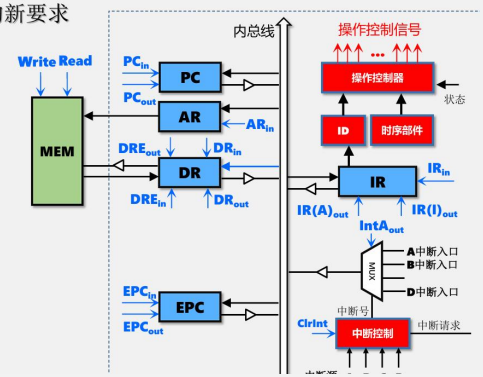


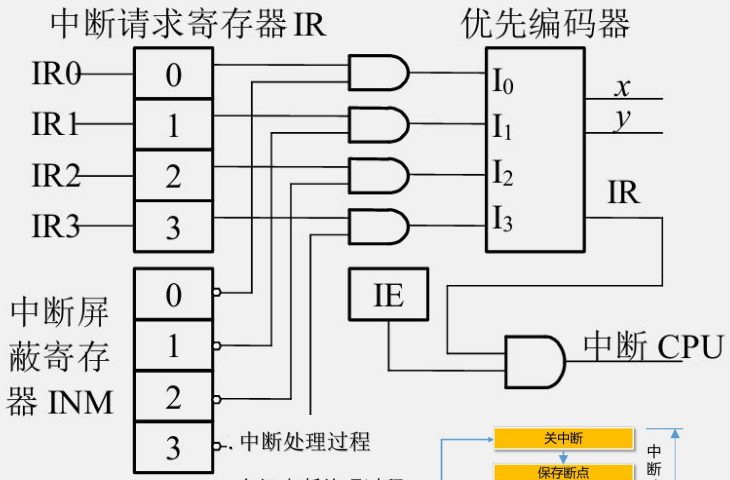


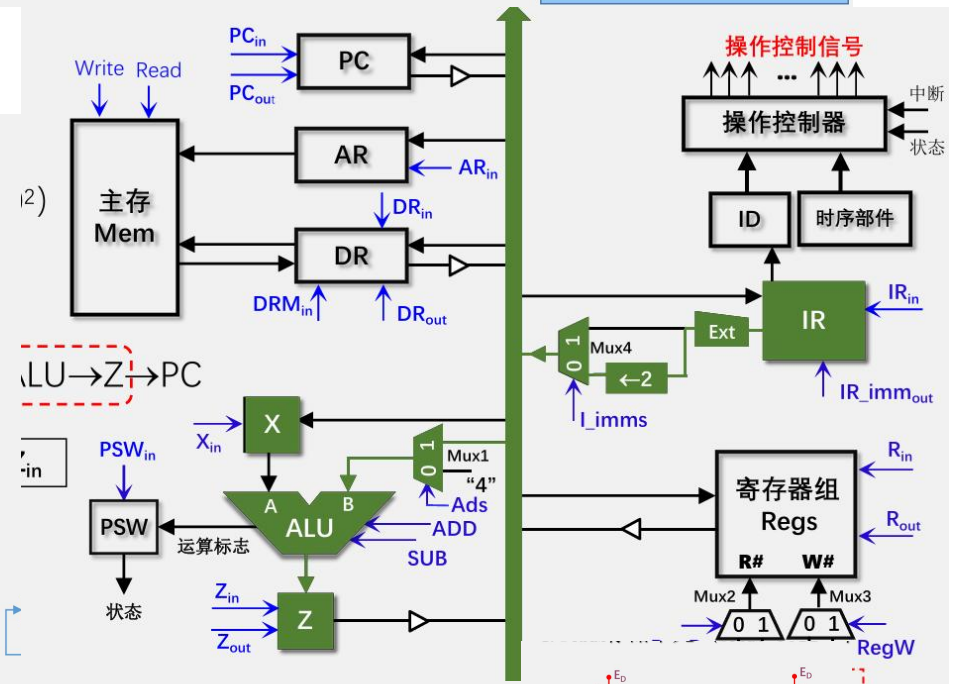
10. 中断异常处理对CPU设计的新要求

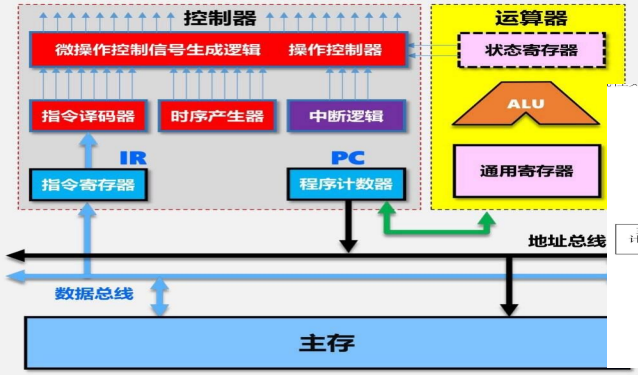
1)中断异常处理数据通路升级

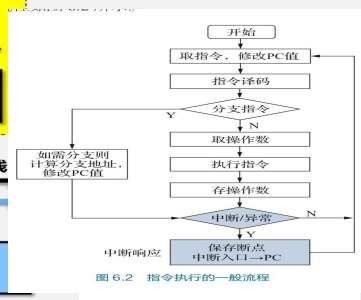
- ♦开关中断
  增加IE寄存器
- ♦保存断点
  增加EPC寄存器/堆栈
- ♦中断识别
  增加中断控制逻辑
- ♦软件支持
  eret指令支持

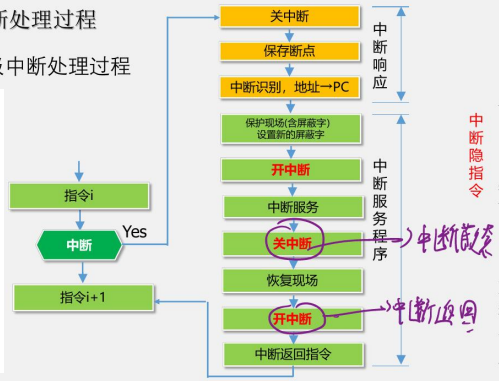


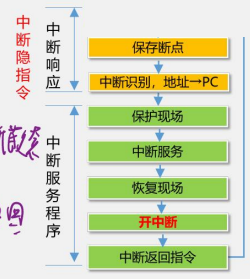


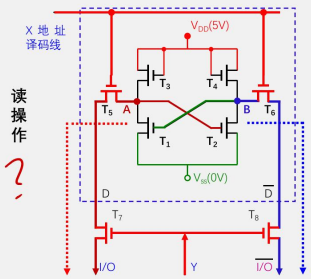


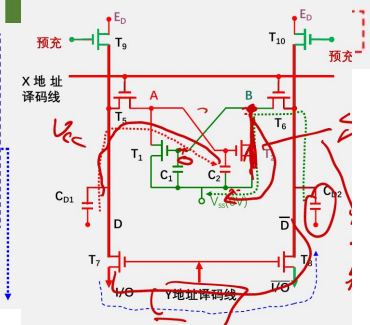


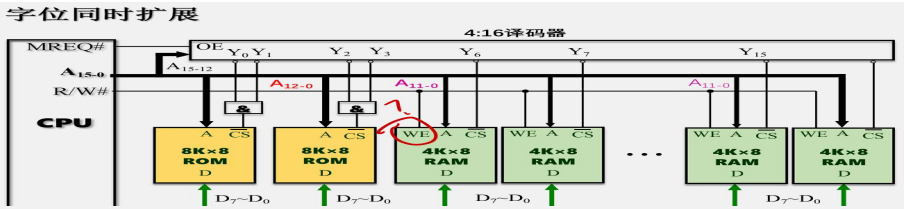




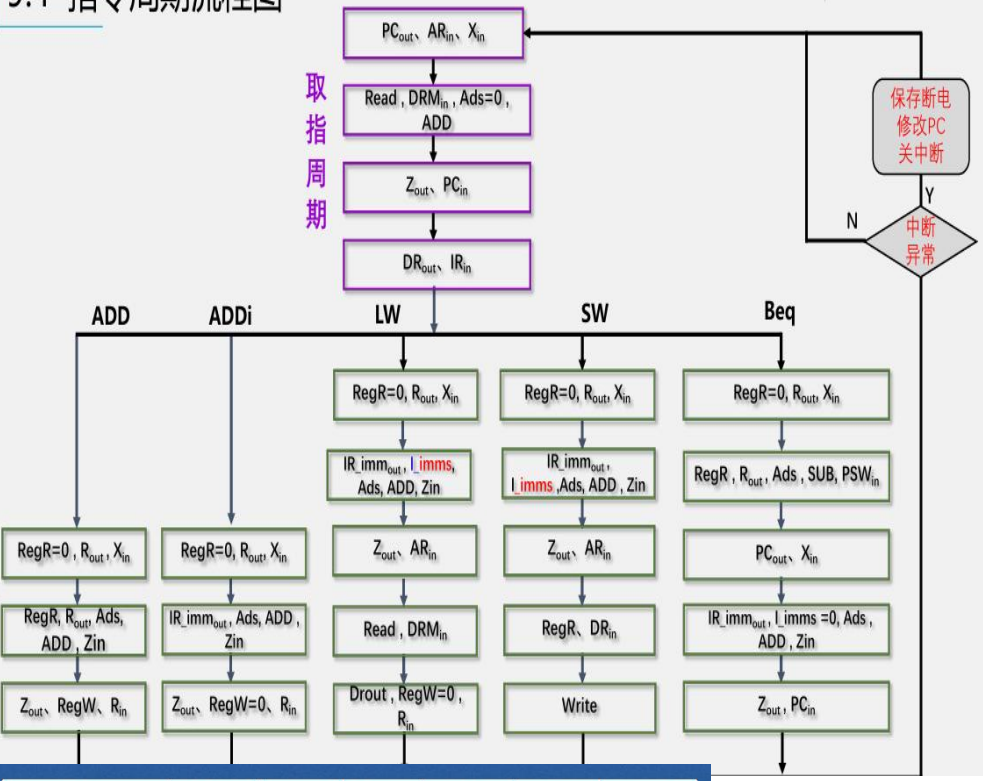




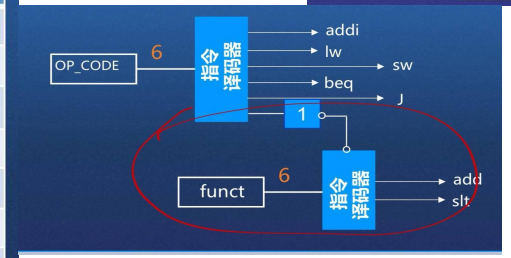


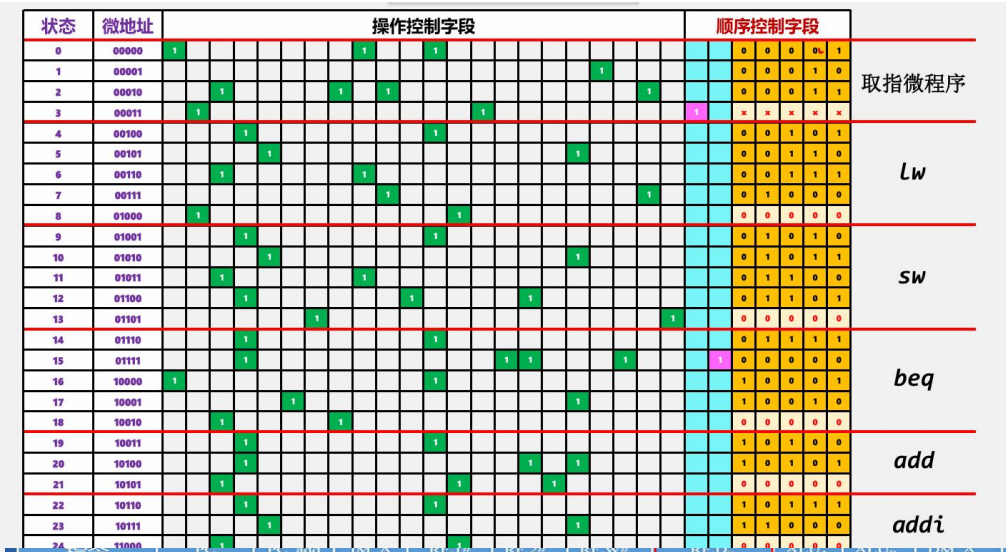


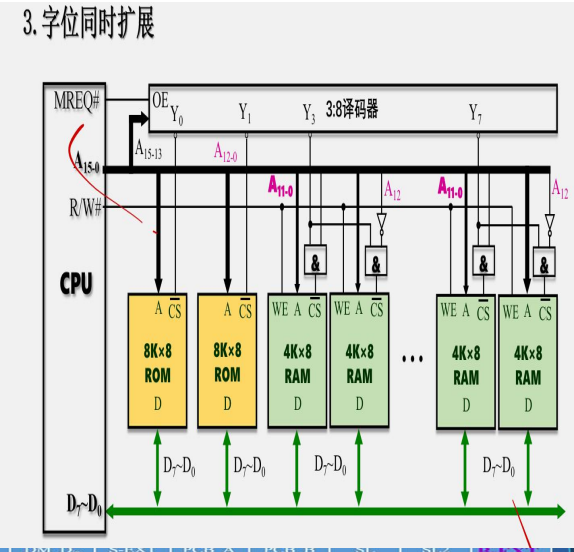
9.4 指令周期流程图



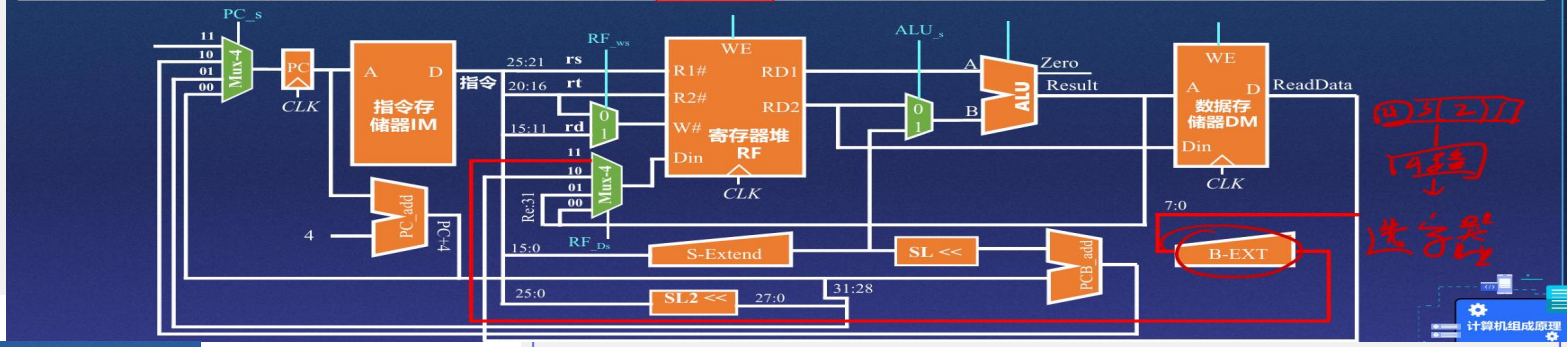
指令	PC_S(2)	RF.WE	RF.WS	RF.DS(2)	ALU_{BS}	DM.WE
add rd rs, rt	0 0	1	1	0 0	0	0
slt rd rs, rt	0 0	1	1	0 1	0	0
Addi rt,rs,imm	0 0	1	0	0 0	1	0
lw rt, imm(rs)	0 0	1	0	1 0	1	0
Sw rt, imm(rs)	0 0	0	0	0 0	1	1
beq rs, rt, imm*	1 0	0	0	0 0	0	0
j addr	0 1	0	0	0 0	0	0
LB rs,rt,imm	0 0	1	0	1 1	1	0







指令	PC	PC_add	RF_A	RF_B	RF_WR	RF_WD	ALU_A	ALU_B	DM_A	DM_Din	S-EXT	PCB_A	PCB_B	SL	SL2	B-EXT
add rd rs, rt	PC_add	PC	PC	I[25:21]	I[20:16]	I[15:11]	ALU_{Re}	RF_{RD1}	RF_{RD2}							
slt rd rs, rt	PC_add	PC	PC	I[25:21]	I[20:16]	I[15:11]	1:$ALU_{Re\,32}$=1 0:$ALU_{Re\,32}$=0									
Addi t,rs,imm	PC_add	PC	PC	I[25:21]		I[20:16]		RF_{RD1}	S-EXT			I[15:0]				
lw rt, imm(rs)	PC_add	PC	PC	I[25:21]		I[20:16]	DM	RF_{RD1}	S-EXT	ALU_{Re}		I[15:0]				
Sw rt, imm(rs)	PC_add	PC	PC	I[25:21]	I[20:16]			RF_{RD1}	S-EXT	ALU_{Re}	RF_{RD2}	I[15:0]				
beq rs, rt, imm	PCB_add	PC	PC	I[25:21]	I[20:16]			RF_{RD1}	RF_{RD2}			I[15:0]	SL	PC_add	S-EXT	
j addr	SL2*														I[25:0]	
LB rt,rs,imm	PC_add	PC	PC	I[25:21]		I[20:16]	B_EXT	RF_{RD1}	S-EXT			I[15:0]				DM[7:0]



PCout、DRout、Rout、IR(A)out、Zout、IR(I)out
+4、ADD、SUB
writeread
填行的接口的输入指令
简化内部减低输入维度