EXCEPTIONS & INTERRUPTS
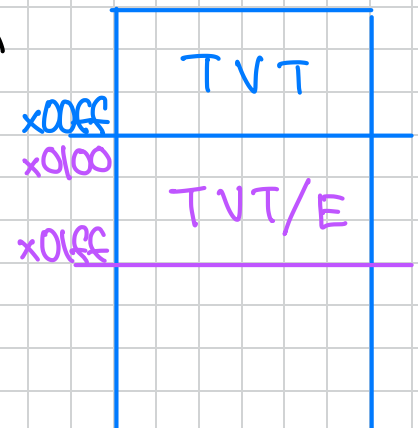
Assembly Errors

Runtime Errors (Exceptions)

    ① ACV: Access Control Violation — invalid memory ranges

    ② IOV: Illegal Opcode Violation (opcode B DNE)

    ③ PMV: Privilege Mode Violation (RTI - supervisor mode)

EXCEPTION HANDLING

A routine (exception handler) is executed on an exception

x00ff	TVT
x0100	
x01ff	TVT/E

INTERRUPTS

WFI - Waiting for interrupt

LC3 : 1 interrupt - keyboard

ARM : ~60 interrupts

x86 : ~100 interrupts

IVT - Interrupt Vector Table - similar to traps, run some code when smth happen

KEYBOARD INTERRUPTS

① Enable interrupt   interrupt enable   0 : off
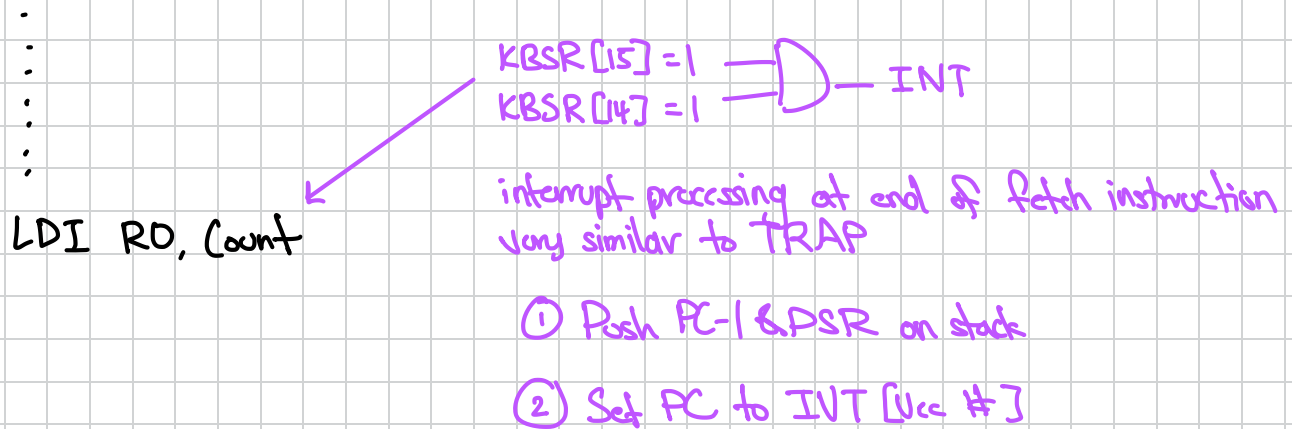
KBSR [| | | | | |]   1 : on

15 14

② Place the address of an Interrupt Service Routine in the IVT

$M[x0180] \longleftarrow x2000$

KBISR
x2000

③ Trigger : keystrike → KBSR[14] = 1

INTERRUPT PROCESSING

$\vdots$

LDI R0, Count

KBSR[15] = 1
KBSR[14] = 1 $\quad$ — INT

interrupt processing at end of fetch instruction
very similar to TRAP

① Push PC-1 & PSR on stack

② Set PC to IVT [vec #]

IF → DE → EV → FO → EX → SR

↑ LC3

↑ ARM x86

KEYBOARD INTERRUPT LC3