Design Manual (Monorail emulator)

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1 Data structure

* 1. Register

Register Label Usage

r15 one

r14 zero

r25 tempMain temporary register used in main function

r24 tempSec

r22 cursorPos

r21 storagePos

r20 row track the current row

r19 col track the current column

r18 mask used for scanning

r0 mulRes\_l

r1 mulRes\_h

r2 invEspression

r3 OVFOccured to see if overflow occurs

* 1. Addresses

Name Address Usage

PORTLDIR 0b11110000 Port L (I/O)

INITCOLMASK 0b11101111 initialize scanning column

INITROWMASK 0b00000001 initialize scanning row

ROWMASK 0b00001111 obtain input from Port L

LCD\_RS 7

LCD\_E 6

LCD\_RW 5

LCD\_BE 4

* 1. Data segment (.dseg)

Name size Usage

stationNames 100 10 stations with 10 ea

travelTimes 10 10 gaps with 1 ea

stopTime 1 just an integer

1. Procedure
   1. The number of stations
   2. The names of each station
   3. Travel time between two stations
   4. Stopping time at each station
   5. Emulation

I write a loop, which allows the monorail travels from one station to the next station, and of course the monorail can approach the first station from the last station. Whether it will stop or not depends on whether PB0 or PB1 is pressed.