ECE 3120
Computer Systems
Labels & Addressing

Manjeera Jeedigunta

http://blogs.cae.tntech.edu/msjeedigun21

Email: msjeedigun21@tntech.edu

Tel: 931-372-6181, Prescott Hall 120

Labels

- Label → Memory Address

```
        org    $1000
array:  db     10
```

These instructions mean that the label array is nothing but the memory address $1000

Label takes the memory address of the location counter

Location Counter & Labels

```
          org    $1000
Array1:   db     10,20        ; LC after this
                               ;instruction is $1002

Array2:   db     30,40        ;LC after this
                               ;instruction in at $1004
```

Array1 → $1000 → LC at that point

Array2 → $1002 → LC at that point

Example1 : Labels

```
        org    $1000
Array   db     10,20
        ldaa   array
```

→ Ldaa $1000   ; since array=$1000
→ A = 10   ; contents of Memory location
                       ;$1000

Example2: Labels

```
        org    $1000
Array   db     10,20
        ldaa   #array
```

➔ Ldaa   #$1000   ;since array=$1000
➔ A = $1000

Example3 : Labels

```
            org     $1000
Array       db      1,3,5,6,7,8,9,10,22      ;9 elements
N           equ     9           ;array count
            ldx     #array+N-1 ;X → $1000+9-1=$1008
                                ;pointing to the last element
            ldaa    #20                 ;A=20
            cmpa    0,x                 ; Contents of A and Contents
                                        ;at memory location pointed
                                        ;by X , i.e, 20 & 22
            cmpa    -3,x                ;X→$1008, -3,X→$1008-
                                        ;3=$1005 → 8
                                        ;so comparing 20 & 8
```

Try this..

            org $1000

Array1:   dw   10,20

Array2:   dw   30,40

What are the memory addresses of

Array1 → $1000

Array2 → $1004

What about this…

```
            org     $1000
Array1:     db      10,20,30,40,50          ;5 elements
Array2:     db      90,80,70,55             ;4 elements
N1          equ     5
N2          equ     4
            ldx     #array1        ;what does X have?   $1000
            ldy     #array2+N2-1   ;what does Y have?   $1005
            ldaa    3,x            ;what does A have?    40
            ldab    -2,y           ;what does B have?    70
```

Now try this..

```
              org       $1000
Array1:       db        10,20,30,40,50                    ;5 elements
N1            equ       5
              ldx       #array1+N-3 ;what does X have?    $1002
              ldy       #array1        ;what does Y have?  $1000
              ldaa      array1         ; what does A have?  10
              ldab      #65            ;what does B have?   65
              cmpa      0,x       what 2 no.s are we comparing?   10,30
              cmpb      4,y       what 2 no.s are we comparing?   65,10
```