מעבדה בתכנות מערכות - פרויקט סיום

איך מקמפלים את הפרויקט

- יש לוודא שקיימת תיקייה build תחת התיקייה הראשית של הפרויקט
- יש להריץ make proj

```
$ ls
API                      AssemblyTranslator.h  build      Helpers.h
AssemblyTranslator.c  AssmeblerMain.c         Helpers.c  Makefile
$ make proj
gcc API/*.c API/Core/*.c Helpers.c AssemblyTranslator.c AssmeblerMain.c -o build/AssemblerMain -Wall
-g -ansi -pedantic -m32
$ cd build
$ ls
AssemblerMain
$ ./AssemblerMain
Source files should be provided: ./AssemblerMain file1 file2 ...
```

דוגמת הרצה - הדוגמה מהספר

איך זה נראה מהטרמינל

```
$ ls
AssemblerMain
$ ls ../example_outputs
book_example.as  invalid_instruction.as  unknown_symbol.as
$ ./AssemblerMain ../example_outputs/book_example
$ ls ../example_outputs
book_example.am  book_example.ent  book_example.obj        unknown_symbol.as
book_example.as  book_example.ext  invalid_instruction.as
```

שימו לב שהקבצים הנדרשים נוצרים. ולהלן התוכן של קבצי הפלט:

```
$ cat ../example_outputs/book_example.obj
m f
$% @%
$^ gm
$& !%
$* !@
$< ^k
$> %!
$a fa
$b i%
$c !@
$d o!
$e vc
$f *s
$g #g
$h e%
$i gi
$j @c
$k gm
$l !<
$m gk
$n k%
$o !@
$p u!
$q $@
$r $#
$s $$
$t $%
$u $^
$v $&
%! !!
%@ !&
%# vn
%$ !f
%% !m
%^ !<
%& $@
%* $#
%< !!
```

```
$ cat ../example_outputs/book_example.ent
LOOP $b
LENGTH %@
$ cat ../example_outputs/book_example.ext
L3 $o
W $*
W $c
```

הקובץ קלט:

```
.entry LOOP
.entry LENGTH
.extern L3
.extern W

MAIN:    mov S1.1, W
; Invalid instruction ahead
xorg r2,STR

LOOP:    jmp W

; invalid instruction ahead
wat #-5
sub r1, r4

; invalid instruction ahead
lol K

; another comment

mov S1.2, r3
bne L3
; Let' put a comment here.
END:     hlt
STR:     .string "abcdef"
LENGTH: .data 6, -9 , 15
K:       .data 22
S1:      .struct 8, "ab"
```
invalid_instruction.as (END)

Standard output:

```
$ ./AssemblerMain ../example_outputs/invalid_instruction
E: Line idx 6: invalid instruction
E: Line idx 8: invalid instruction
E: Line idx 10: invalid instruction
E: error in assemblying process.
```

קובץ הקלט:

```
$ cat ../example_outputs/unknown_symbol.as
.entry LOOP
.entry LENGTH

.extern L3

.extern W

; Unknown symbol here
add r2,MY_NONEXISTING_SMBOL

; Unknown Symbol here
bne L5

END:    hlt

STR:    .string "abcdef"
LENGTH: .data 6, -9 , 15
K:      .data 22
S1:     .struct 8, "ab"
```

Standard Output

```
$ ./AssemblerMain ../example_outputs/unknown_symbol
E: Line idx 5: symbol not found
E: Line idx 6: symbol not found
E: error in assemblying process.
```

דוגמת הרצה - Macro

קובץ קלט

```
$ cat ../example_outputs/macros_included.as
.entry LOOP
.entry LENGTH

.extern L3

.extern W

macro MY_MACRO
    mov r1, r2
    inc L3
endmacro

MAIN:   mov S1.1, W
add r2,STR
bne L3
; Let' put a comment here.
MY_MACRO

END:    hlt

MY_MACRO
STR:    .string "abcdef"
LENGTH: .data 6, -9 , 15
K:      .data 22
S1:     .struct 8, "ab"
```

פלט אסמבלר + פלט קובץ am

```
$ ./AssemblerMain ../example_outputs/macros_included
$ cat ../example_outputs/macros_included.am
.entry LOOP
.entry LENGTH
.extern L3
.extern W
MAIN: mov S1.1, W
add r2,STR
bne L3
mov r1, r2
inc L3
END: hlt
mov r1, r2
inc L3
STR: .string "abcdef"
LENGTH: .data 6, -9 , 15
K: .data 22
S1: .struct 8, "ab"
```

```
$ ./AssemblerMain ../example_outputs/macros_included
$ cat ../example_outputs/macros_included.am
.entry LOOP
.entry LENGTH
.extern L3
.extern W
MAIN: mov S1.1, W
add r2,STR
bne L3
mov r1, r2
inc L3
END: hlt
mov r1, r2
inc L3
STR: .string "abcdef"
LENGTH: .data 6, -9 , 15
K: .data 22
S1: .struct 8, "ab"
```