

מעבדה בתכנות מערכות - מטלה 14 (פרויקט סוף)

מגיש: ניצן כהן 312494602

הרצות בדיקה על הקלט הנתון

```
ps.as
; file ps.as
.entry LIST
.extern W
.define sz = 2
MAIN:  mov r3, LIST[sz]
LOOP:  jmp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
L1:    inc L3
      .entry LOOP
      bne LOOP |
END:   hlt
.define len = 4
STR:   .string "abcdef"
LIST:  .data 6, -9, len
K:     .data 22
.extern L3
```

קימפול (ללא אזהרות) וריצה מלאה על קלט תקין

```
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
```

```
File 1 opened successfully
```

```
Deploying macros ps.am
```

```
Macros deployed successfully
```

```
initiating first run
```

```
First pass run completed successfully on file ps.am
```

```
Running second pass on file ps.am
```

```
finished coding
```

```
entry file closed succesfully
```

```
extern file closed successfully
```

```
finished comm
```

```
Object file closed successfully
```

```
INFO: Finished running assembler on file ps.am
```

```
-----
```

```
memory released successfully
```

```
Original file closed successfully
```

```
Macro file saved successfully
```

```
user@ubuntu:~/Desktop/Ass14 - Final Project$ █
```

```

Binary representation of 56 in line 100 is: 0000000000111000
Binary representation of 96 in line 101 is: 0000000001100000
Binary representation of 530 in line 102 is: 0000001000010010
Binary representation of 8 in line 103 is: 0000000000001000
Binary representation of 580 in line 104 is: 0000001001000100
Binary representation of 1 in line 105 is: 0000000000000001
Binary representation of 768 in line 106 is: 0000001100000000
Binary representation of -20 in line 107 is: 111111111101100
Binary representation of 40 in line 108 is: 000000000101000
Binary representation of 502 in line 109 is: 0000000111110110
Binary representation of 20 in line 110 is: 0000000000010100
Binary representation of 502 in line 111 is: 0000000111110110
Binary representation of 8 in line 112 is: 0000000000001000
Binary representation of 252 in line 113 is: 0000000011111100
Binary representation of 48 in line 114 is: 0000000000110000
Binary representation of 80 in line 115 is: 0000000001010000
Binary representation of 542 in line 116 is: 0000001000011110
Binary representation of 8 in line 117 is: 0000000000001000
Binary representation of 644 in line 118 is: 0000001010000100
Binary representation of 1 in line 119 is: 0000000000000001
Binary representation of 452 in line 120 is: 0000000111000100
Binary representation of 1 in line 121 is: 0000000000000001
Binary representation of 644 in line 122 is: 0000001010000100
Binary representation of 418 in line 123 is: 0000000110100010
Binary representation of 960 in line 124 is: 0000001111000000
data
Binary representation of 97 in line 125 is: 0000000001100001
Binary representation of 98 in line 126 is: 00000000001100010
Binary representation of 99 in line 127 is: 0000000001100011
Binary representation of 100 in line 128 is: 0000000001100100
Binary representation of 101 in line 129 is: 0000000001100101
Binary representation of 102 in line 130 is: 0000000001100110
Binary representation of 0 in line 131 is: 0000000000000000
Binary representation of 6 in line 132 is: 00000000000000110
Binary representation of -9 in line 133 is: 1111111111110111
Binary representation of 4 in line 134 is: 0000000000000100
Binary representation of 22 in line 135 is: 0000000000010110

```

Decimal Address	Source Code	Binary Machine Code
0100	MAIN: mov r3, LIST[sz]	00000000111000
0101		000000001100000
0102		00001000010010
0103		000000000001000
0104	LOOP: jmp W	00001001000100
0105		000000000000001
0106	prn #-5	00001100000000
0107		1111111101100
0108	mov STR[5], STR[2]	00000000101000
0109		00000111110110
0110		00000000010100
0111		00000111110110
0112		00000000001000
0113	sub r1, r4	00000011111100
0114		00000000110000
0115	cmp K, #sz	00000001010000
0116		000010000011110
0117		00000000001000
0118	bne W	00001010000100
0119		00000000000001
0120	L1: inc L3	00000111000100
0121		00000000000001
0122	bne LOOP	00001010000100
0123		00000110100010
0124	END: hlt	00001111000000
0125	STR: .string "abcdef"	00000001100001
0126		00000001100010
0127		00000001100011
0128		00000001100100
0129		00000001100101
0130		00000001100110
0131		00000000000000
0132	LIST: .data 6, -9, len	00000000000110
0133		11111111110111
0134		00000000000100
0135	K: .data 22	00000000010110

התאמה
מלאה בין
הפלטים
הבינאריים

קבצי הentry והextern (שלי)



The image shows a screenshot of a code editor with two tabs open: 'ps.as' and 'ps.ent'. The 'ps.as' tab is active and displays assembly code. The 'ps.ent' tab is also visible and displays assembly code. The code in 'ps.as' includes a 'LIST' directive at address 132 and a 'LOOP' directive at address 104. The code in 'ps.ent' includes a 'L3' directive at address 121 and two 'W' directives at addresses 105 and 119. The editor has a dark theme and a sidebar on the left with icons for a globe and a document with a checkmark.

```
ps.as  x firstrun.c  x functions.c  x secondrun.c  x ps.ent
LIST 132
LOOP 104

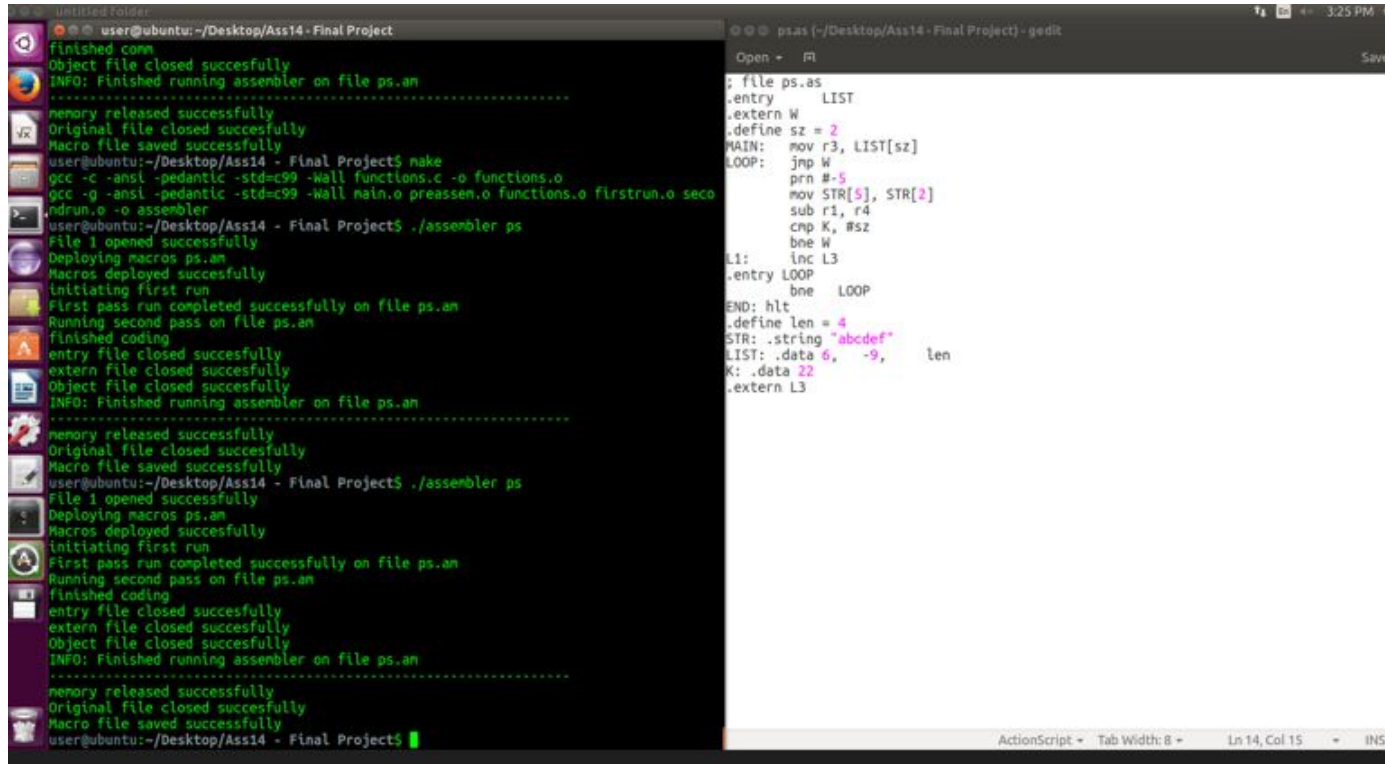
ps.as  x firstrun.c  x functions.c  x secondrun.c  x ps.ent  x
L3 121
W 105
W 119
```

ps.ob (~/Desktop/Ass14 - Final Project/input and output files) - gedit

```
25 11
0100 ****!%*
0101 ***#%*
0102 ***%#%*
0103 *****%*
0104 *****#*
0105 **!***
0106 *****##*
0107 *****%*
0108 **#!!#%
0109 *****##*
0110 **#!!#%
0111 *****%*
0112 ****!!*
0113 *****!*
0114 *****##*
0115 ***%#!%
0116 *****%*
0117 *****#*
0118 *****#*
0119 ***%*#*
0120 **#%*%*
0121 **!!***
0122 *****
0123 *****
0124 *****
0125 ***#%*#
0126 ***#%*%
0127 ***#%*!
0128 ***#%*#*
0129 ***#%##
0130 ***#%##%
0131 *****
0132 *****#%
0133 *****%#
0134 *****#*
0135 *****##%
```

קובץ object

טיפול בשגיאות ומקרי קצה



```
user@ubuntu:~/Desktop/Ass14 - Final Project$ make
finished com
Object file closed successfully
INFO: Finished running assembler on file ps.an
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ make
gcc -c -ansi -pedantic -std=c99 -Wall functions.c -o functions.o
gcc -g -ansi -pedantic -std=c99 -Wall main.o preassem.o functions.o firstrun.o secondrun.o -o assembler
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.an
Macros deployed successfully
Initiating first run
First pass run completed successfully on file ps.an
Running second pass on file ps.an
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.an
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.an
Macros deployed successfully
Initiating first run
First pass run completed successfully on file ps.an
Running second pass on file ps.an
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.an
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$
```

```
; file ps.as
;entry LIST
;extern W
;define sz = 2
MAIN: mov r3, LIST[sz]
LOOP: jmp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
L1:   inc L3
      entry LOOP
      bne LOOP
END: hlt
;define len = 4
STR: .string "abcdef"
LIST: .data 6, -9, len
K: .data 22
;extern L3
```

עבור הקלט הבא:

ריצה תקינה, ללא

השפעה של כמות

הרווחים בין

המילים

מספר פסיקים לא חוקי

```
Ass14 - Final Project
user@ubuntu: ~/Desktop/Ass14 - Final Project

Macros deployed successfully
initiating first run
First pass run completed successfully on file ps.as
Running second pass on file ps.as
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.as
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.as
Macros deployed successfully
Initiating first run
First pass run completed successfully on file ps.as
Running second pass on file ps.as
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.as
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ make
make: 'assembler' is up to date.
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.as
Macros deployed successfully
Initiating first run
Error in line 18. Commas are not coherent with data
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.as
-----
memory released successfully
Original file closed successfully
```

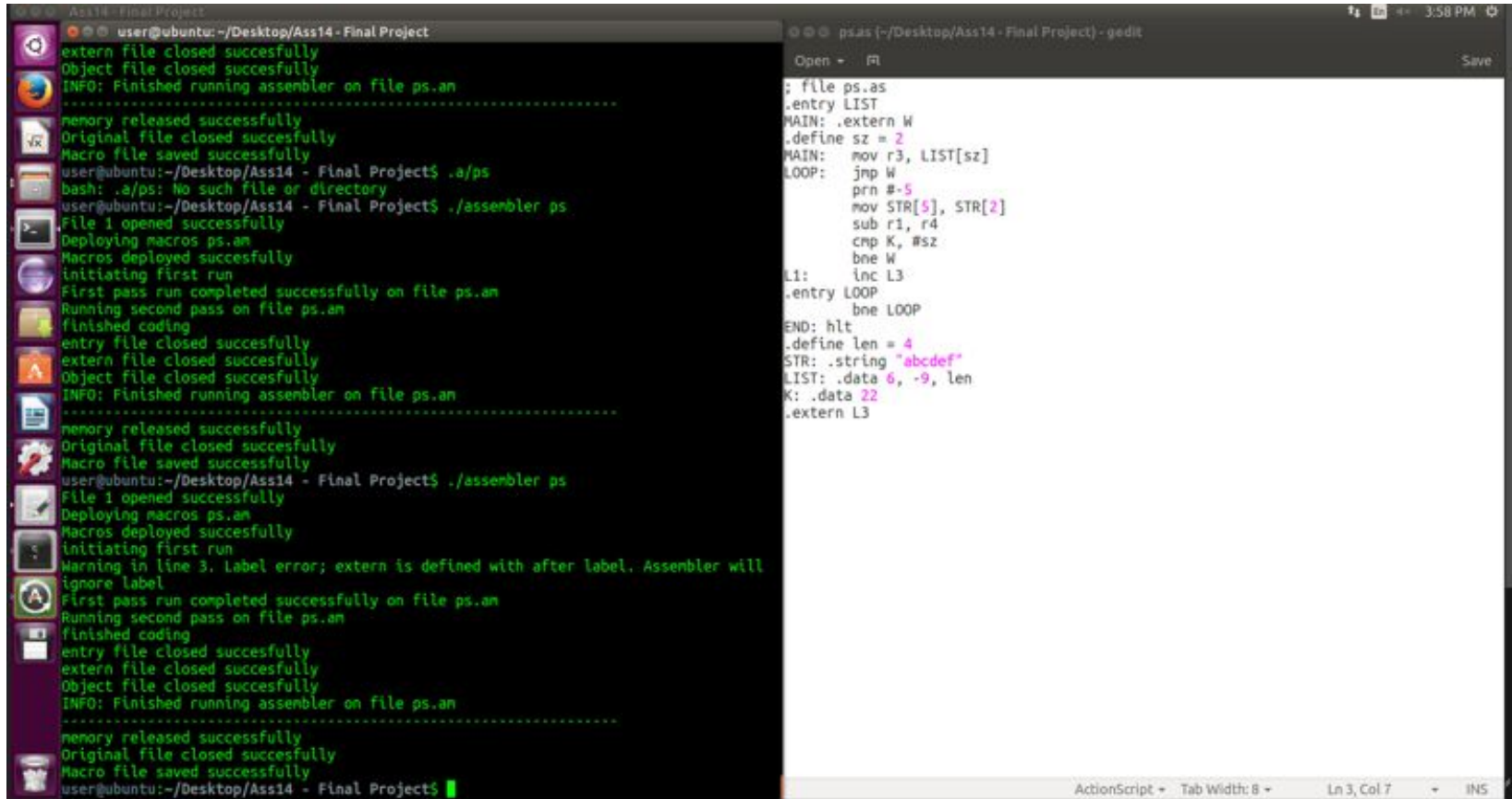
```
ps.as (~/Desktop/Ass14 - Final Project) - gedit
Open  Save

; file ps.as
.entry LIST
.extern W
.define sz = 2
MAIN:  mov r3, LIST[sz]
LOOP:  jmp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
      lnc W
L1:    lnc L3
      .entry LOOP
      bne LOOP
END:   hlt
.define len = 4
STR:   .string "abcdef"
LIST:  .data 6,-9, len
K:     .data 22
      .extern L3
```


סוגר מרובע לא סגור

```
user@ubuntu: ~/Desktop/Ass14 - Final Project
Error in line 18. Commas are not coherent with data
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
Error in line 8. Square brackets opened but not closed
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
Error in line 8. Square brackets opened but not closed
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
Error in line 8. Square brackets opened but not closed
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
```

שגיאות תווית - extern after label



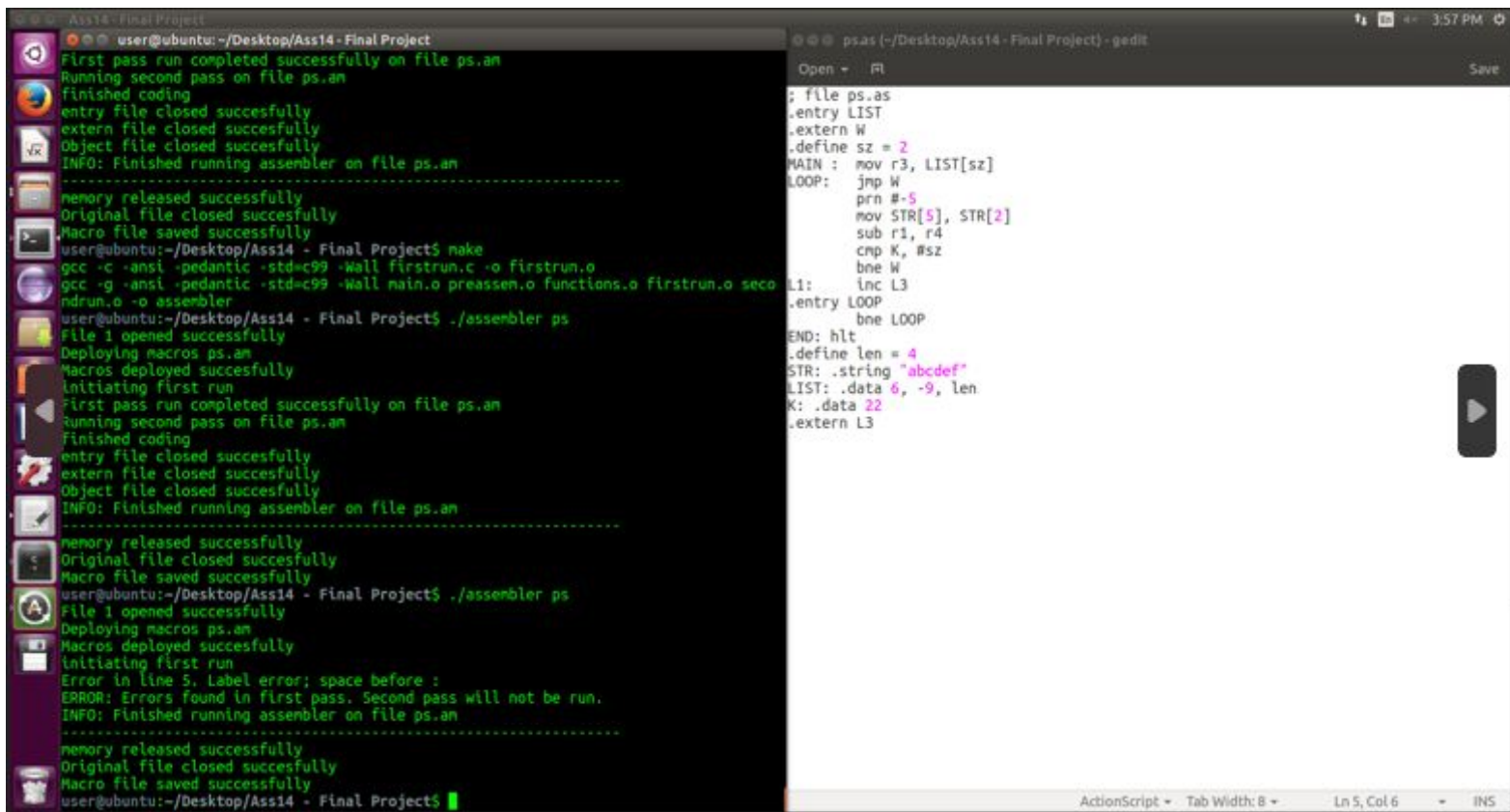
```
user@ubuntu: ~/Desktop/Ass14 - Final Project
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./a/ps
bash: ./a/ps: No such file or directory
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
initiating first run
First pass run completed successfully on file ps.am
Running second pass on file ps.am
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
initiating first run
Warning in line 3. Label error; extern is defined with after label. Assembler will
ignore label
First pass run completed successfully on file ps.am
Running second pass on file ps.am
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$
```

```
ps.as [~/Desktop/Ass14 - Final Project] - gedit
Open + [ ] Save

; file ps.as
.entry LIST
MAIN: .extern W
.define sz = 2
MAIN: mov r3, LIST[sz]
LOOP: jnp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
L1:   inc L3
.entry LOOP
      bne LOOP
END: hlt
.define len = 4
STR: .string "abcdef"
LIST: .data 6, -9, len
K: .data 22
.extern L3
```

ActionScript + Tab Width: 8 + Ln 3, Col 7 + INS

שגיאות תווית - רווח לפני :



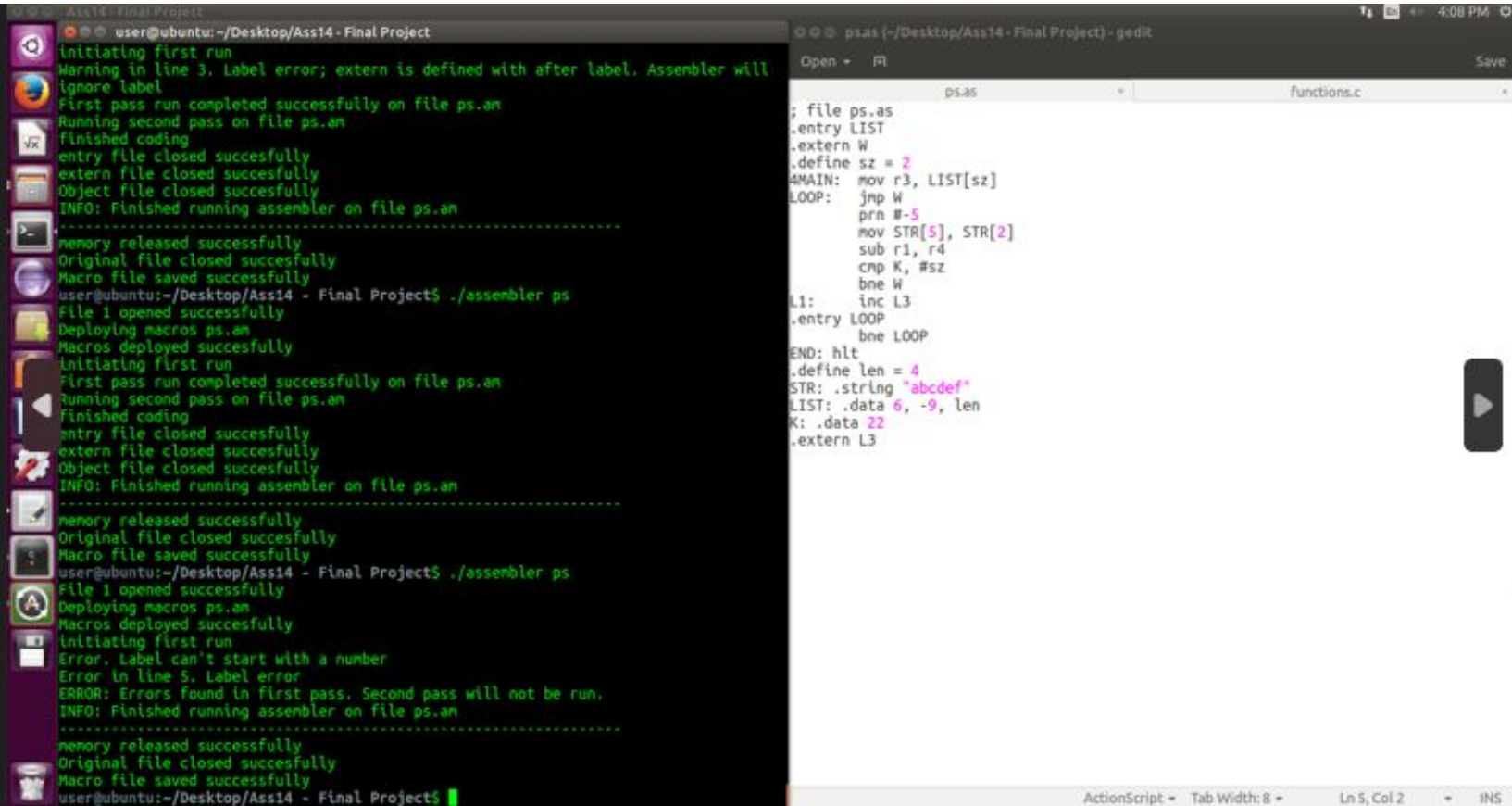
The screenshot shows a terminal window on the left and a code editor on the right. The terminal displays the output of running the 'make' command, which includes messages about the first and second passes of the assembler, file closures, and memory release. It also shows the command to run the assembler on 'ps' and the resulting error message: 'Error in line 5, Label error; space before :'. The code editor shows the assembly source file 'ps.as' with the following code:

```
; file ps.as
.entry LIST
.extern W
.define sz = 2
MAIN : mov r3, LIST[sz]
LOOP: jmp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
L1:    inc L3
      .entry LOOP
      bne LOOP
END: hlt
.define len = 4
STR: .string "abcdef"
LIST: .data 6, -9, len
K: .data 22
.extern L3
```

The error message in the terminal is:

```
Error in line 5, Label error; space before :
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.an
```

שגיאות תווית - תווית מתחילה במספר

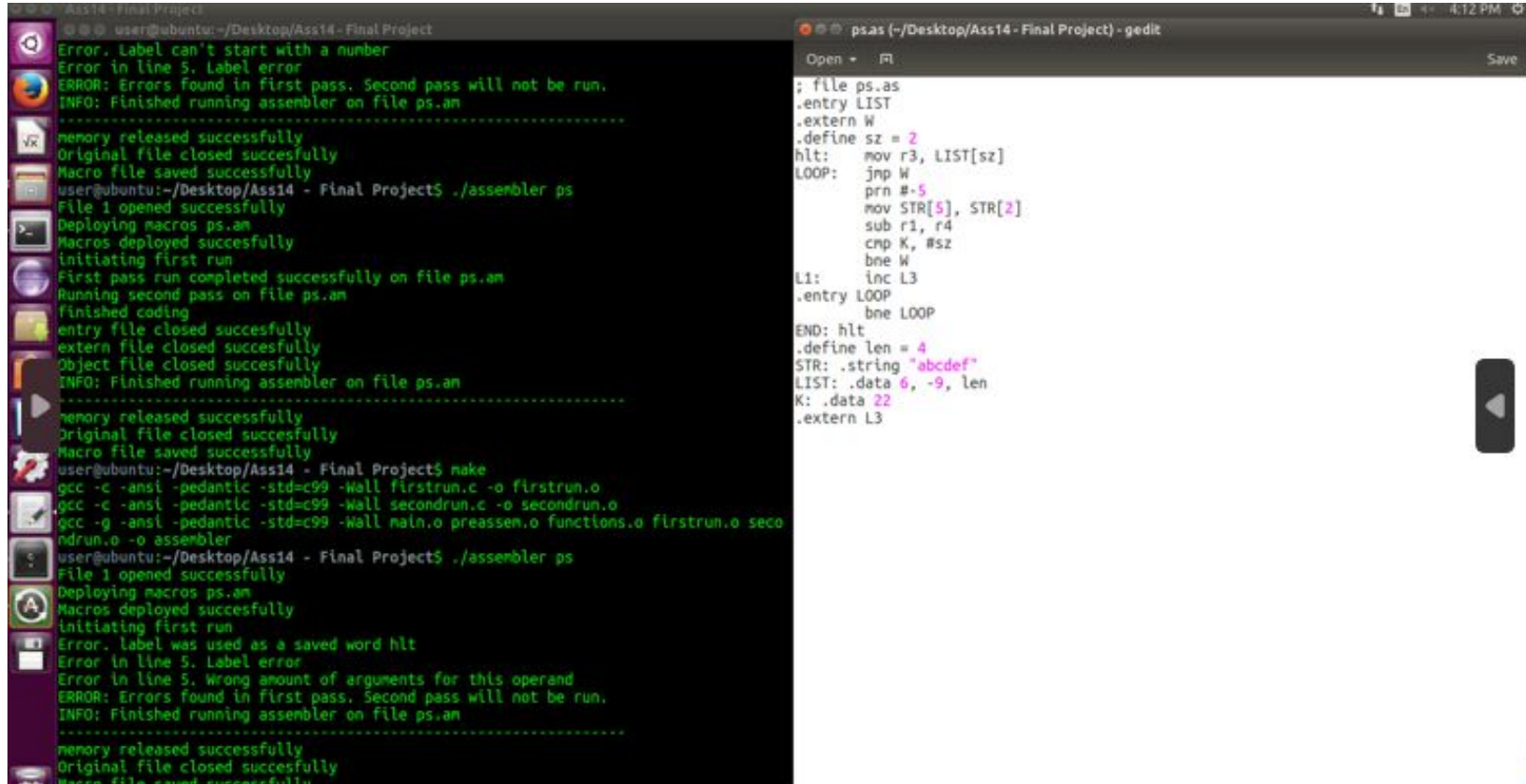


```
Ass14 - Final Project
user@ubuntu: ~/Desktop/Ass14 - Final Project
Initiating first run
Warning in line 3. Label error; extern is defined with after label. Assembler will ignore label
First pass run completed successfully on file ps.am
Running second pass on file ps.am
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
First pass run completed successfully on file ps.am
Running second pass on file ps.am
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
Error. Label can't start with a number
Error in line 5. Label error
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$
```

```
ps.as
functions.c

; file ps.as
entry LIST
extern W
define sz = 2
MAIN: mov r3, LIST[sz]
LOOP: jmp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
L1:   inc L3
entry LOOP
      bne LOOP
END: hit
define len = 4
STR: .string "abcdef"
LIST: .data 6, -9, len
K: .data 22
extern L3
```

שגיאות תווית - מילה שמורה

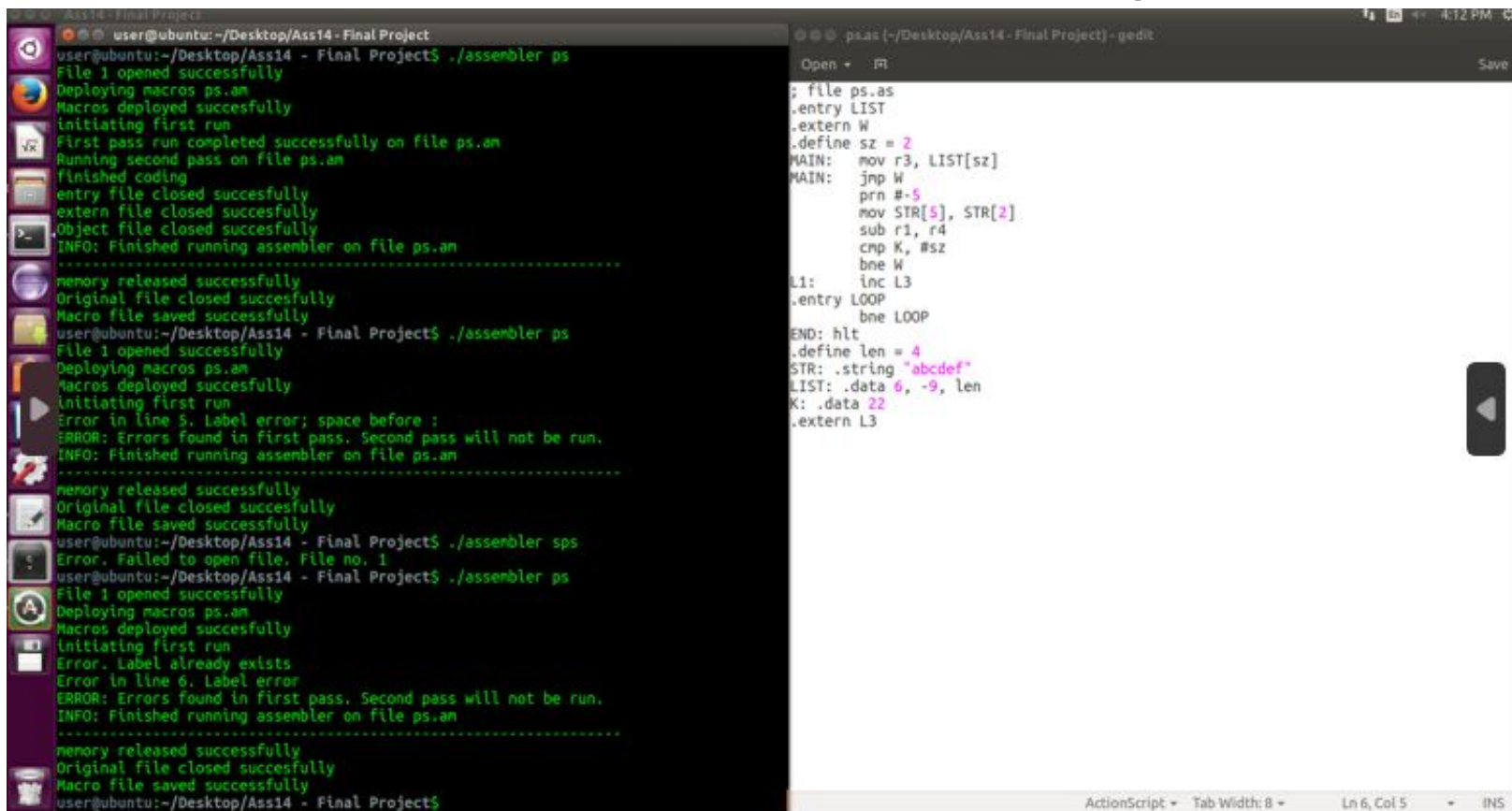


The screenshot shows a terminal window on the left and a code editor on the right. The terminal displays the output of running the assembler twice. The first run shows an error: "Error. Label can't start with a number" and "Error in line 5. Label error". The second run shows a different error: "Error. Label was used as a saved word hlt" and "Error in line 5. Wrong amount of arguments for this operand". The code editor shows the assembly code for file ps.as, which includes a loop and a string definition.

```
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
Error. Label can't start with a number
Error in line 5. Label error
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.an
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.an
Macros deployed successfully
initiating first run
First pass run completed successfully on file ps.an
Running second pass on file ps.an
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.an
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ make
gcc -c -ansi -pedantic -std=c99 -Wall firstrun.c -o firstrun.o
gcc -c -ansi -pedantic -std=c99 -Wall secondrun.c -o secondrun.o
gcc -g -ansi -pedantic -std=c99 -Wall main.o preassem.o functions.o firstrun.o secondrun.o -o assembler
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.an
Macros deployed successfully
initiating first run
Error. Label was used as a saved word hlt
Error in line 5. Label error
Error in line 5. Wrong amount of arguments for this operand
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.an
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
```

```
ps.as (-~/Desktop/Ass14 - Final Project) - gedit
Open  [icon] Save
; file ps.as
.entry LIST
.extern W
.define sz = 2
hlt:  mov r3, LIST[sz]
LOOP: jnp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
L1:   inc L3
      .entry LOOP
      bne LOOP
END: hlt
.define len = 4
STR: .string "abcdef"
LIST: .data 6, -9, len
K: .data 22
      .extern L3
```


שגיאות תווית - תווית קיימת

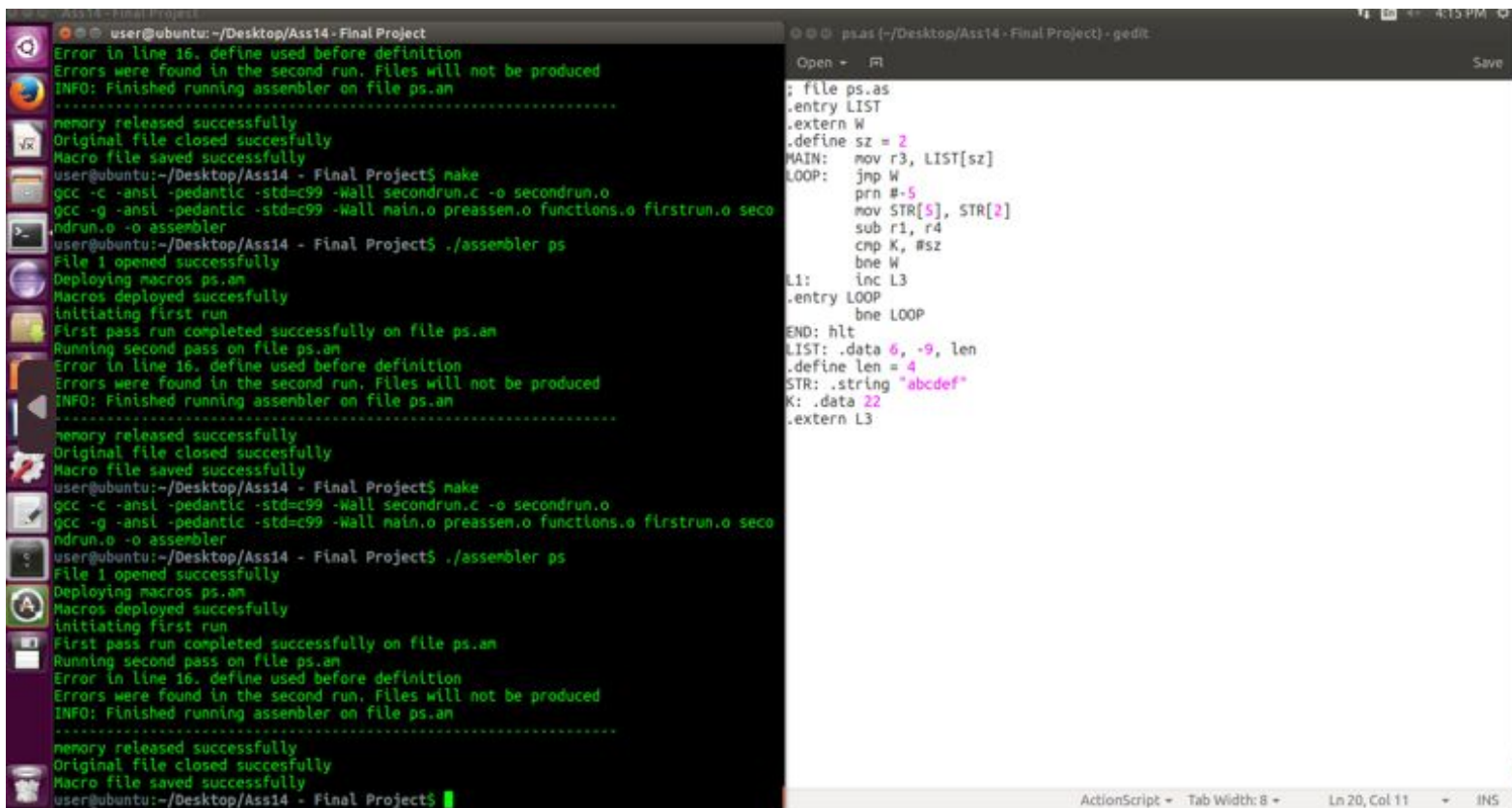


The screenshot shows a terminal window on the left and a code editor on the right. The terminal displays the output of running the 'assembler' command on 'ps.am' and 'sps'. The first run of 'ps.am' is successful, but the second run of 'sps' fails with the error 'Error. Label already exists' in line 6. The code editor shows the assembly code for 'ps.as', which includes a label 'L1' that is used twice, causing the error.

```
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
First pass run completed successfully on file ps.am
Running second pass on file ps.am
finished coding
entry file closed successfully
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
Error in line 5. Label error; space before :
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler sps
Error. Failed to open file. File no. 1
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
Error. Label already exists
Error in line 6. Label error
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$
```

```
ps.as (~/Desktop/Ass14 - Final Project) - gedit
; file ps.as
.entry LIST
.extern W
.define sz = 2
MAIN:  mov r3, LIST[sz]
MAIN:  jmp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
L1:    inc L3
.entry LOOP
      bne LOOP
END:   hlt
.define len = 4
STR:   .string "abcdef"
LIST:  .data 6, -9, len
K:     .data 22
.extern L3
```

שגיאות define - define בשימוש לפני הגדרה



```
user@ubuntu: ~/Desktop/Ass14 - Final Project
Error in line 16. define used before definition
Errors were found in the second run. Files will not be produced
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ make
gcc -c -ansi -pedantic -std=c99 -Wall secondrun.c -o secondrun.o
gcc -g -ansi -pedantic -std=c99 -Wall main.o preassen.o functions.o firstrun.o secondrun.o -o assembler
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
First pass run completed successfully on file ps.am
Running second pass on file ps.am
Error in line 16. define used before definition
Errors were found in the second run. Files will not be produced
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ make
gcc -c -ansi -pedantic -std=c99 -Wall secondrun.c -o secondrun.o
gcc -g -ansi -pedantic -std=c99 -Wall main.o preassen.o functions.o firstrun.o secondrun.o -o assembler
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
Initiating first run
First pass run completed successfully on file ps.am
Running second pass on file ps.am
Error in line 16. define used before definition
Errors were found in the second run. Files will not be produced
INFO: Finished running assembler on file ps.am
.....
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$
```

```
ps.as (~/.Desktop/Ass14 - Final Project) - gedit
Open - [icon] Save

; file ps.as
.entry LIST
.extern W
.define sz = 2
MAIN: mov r3, LIST[sz]
LOOP: jnp W
      prn #-5
      mov STR[5], STR[2]
      sub r1, r4
      cmp K, #sz
      bne W
L1:    inc L3
      .entry LOOP
      bne LOOP
END: hlt
LIST: .data 6, -9, len
      .define len = 4
STR: .string "abcdef"
K: .data 22
      .extern L3
```

ActionScript + Tab Width: 8 + Ln 20, Col 11 + INS

גילוי מספר שגיאות יחד

```
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed successfully
initiating first run
Error. label was used as a saved word mov
Error in line 5. Label error
Error in line 5. Wrong amount of arguments for this operand
Error in line 5. Square brackets opened but not closed
Error in line 18. Commas are not coherent with data
ERROR: Errors found in first pass. Second pass will not be run.
INFO: Finished running assembler on file ps.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
```

מספר הרצות על קלטים שונים (כולם בתיקייה)

```
user@ubuntu: ~/Desktop/Ass14 - Final Project
INFO: Finished running assembler on file test.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler test os2 ps
File 1 opened successfully
Deploying macros test.am
Macros deployed successfully
initiating first run
First pass run completed successfully on file test.am
Running second pass on file test.am
finished coding
extern file closed successfully
Object file closed successfully
INFO: Finished running assembler on file test.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
File 2 opened successfully
Deploying macros os2.am
Macros deployed successfully
Initiating first run
Warning in line 27. Label error; extern is defined with after label. Assembler will ignore label
First pass run completed successfully on file os2.am
Running second pass on file os2.am
finished coding
entry file closed successfully
Object file closed successfully
INFO: Finished running assembler on file os2.am
-----
memory released successfully
Original file closed successfully
Macro file saved successfully
File 3 opened successfully
Deploying macros ps.am
Macros deployed successfully
initiating first run
First pass run completed successfully on file ps.am
Running second pass on file ps.am
```

סיכום

במצגת זו הצגתי רק חלק מן השגיאות אשר הכנסתי לפרויקט. השגיאות נבחרו לפי רמת הרלוונטיות שנראתה לי, אך כמובן ישנן עוד הרבה מנגנונים לגילוי שגיאות בפרויקט עצמו. בקורס ובפרויקט זה למדתי רבות והגעתי לרמת בקיאות גבוהה בשפת C. כמו-כן השתפרו מיומנויות הדיבוג ואלגוריתמיקה שלי, וההבנה המערכתית.