מעבדה בתכנות מערכות - מטלה 14 (פרויקט סוף)

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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 succesfully
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 succesfully
finished comm
Object file closed succesfully
INFO: Finished running assembler on file ps.am
------------------------------------------------------------
memory released successfully
Original file closed succesfully
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: 1111111111101100
Binary representation of 40 in line 108 is: 0000000000101000
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: 0000000001100010
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: 0000000000000110
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 0101 0102 0103	MAIN: mov r3, LIST[sz]	00000000111000 00000001100000 00001000010010 00000000001000
0104 0105	LOOP: jmp W	00001001000100 00000000000001
0106 0107	prn #-5	00001100000000 11111111101100
0108 0109 0110 0111 0112	mov STR[5], STR[2]	00000000101000 00000111110110 00000000010100 00000111110110 00000000001000
0113 0114	sub r1, r4	00000011111100 00000000110000
0115 0116 0117	cmp K, #sz	00000001010000 00001000011110 00000000001000
0118 0119	bne W	00001010000100 00000000000001
0120 0121	L1: inc L3	00000111000100 00000000000001
0122 0123	bne LOOP	00001010000100 00000110100010
0124	END: hlt	00001111000000
0125	STR: .string “abcdef”	00000001100001
0126		00000001100010
0127		00000001100011
0128		00000001100100
0129		00000001100101
0130		00000001100110
0131		00000000000000
0132 0133 0134	LIST: .data 6, -9, len	00000000000110 11111111110111 00000000000100
0135	K: .data 22	00000000010110

התאמה מלאה בין הפלטים הבינארים

קבצי הentry והextern (שלי)

קובץ הobject

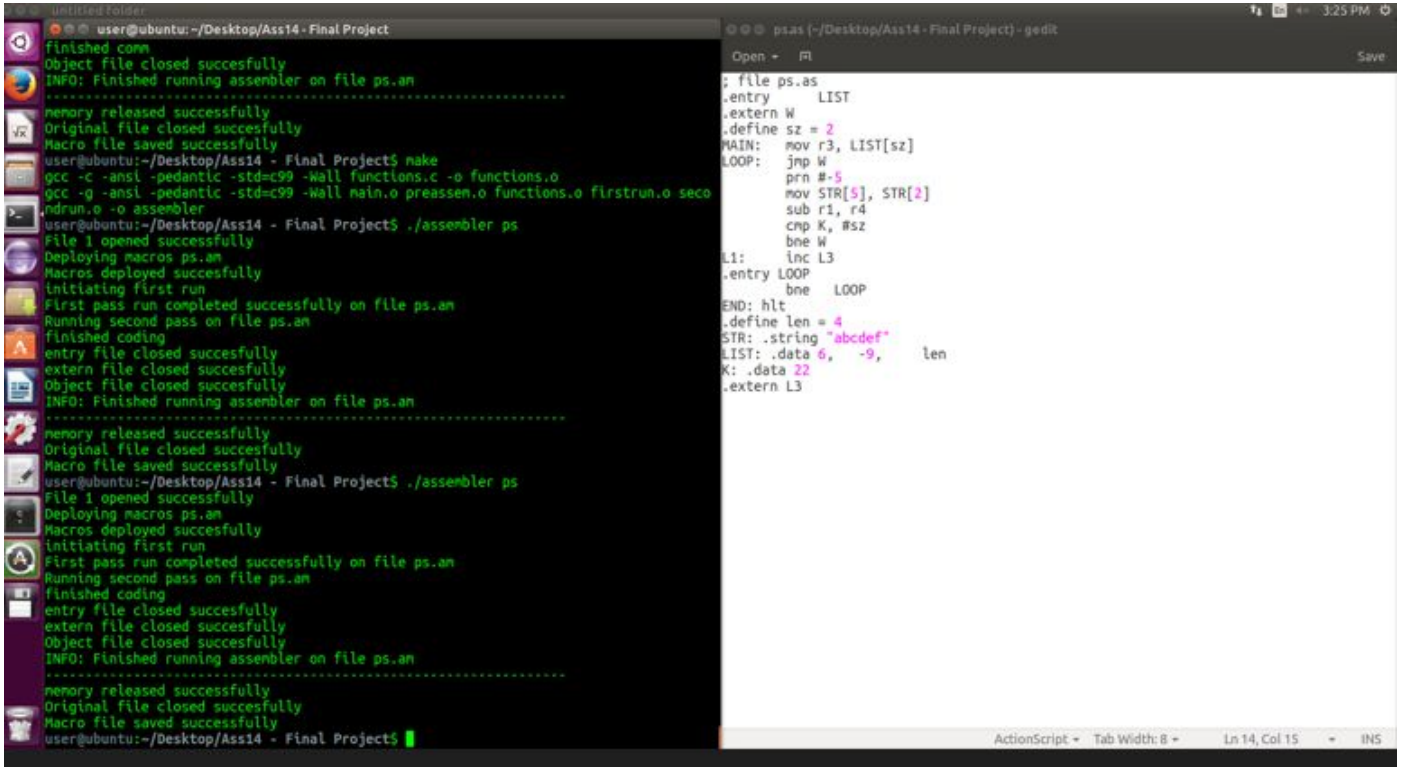
ps.ob (~/Desktop/Ass14 - Final Project/input and output files) - gedit

Open Save

```
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 ****##%
```

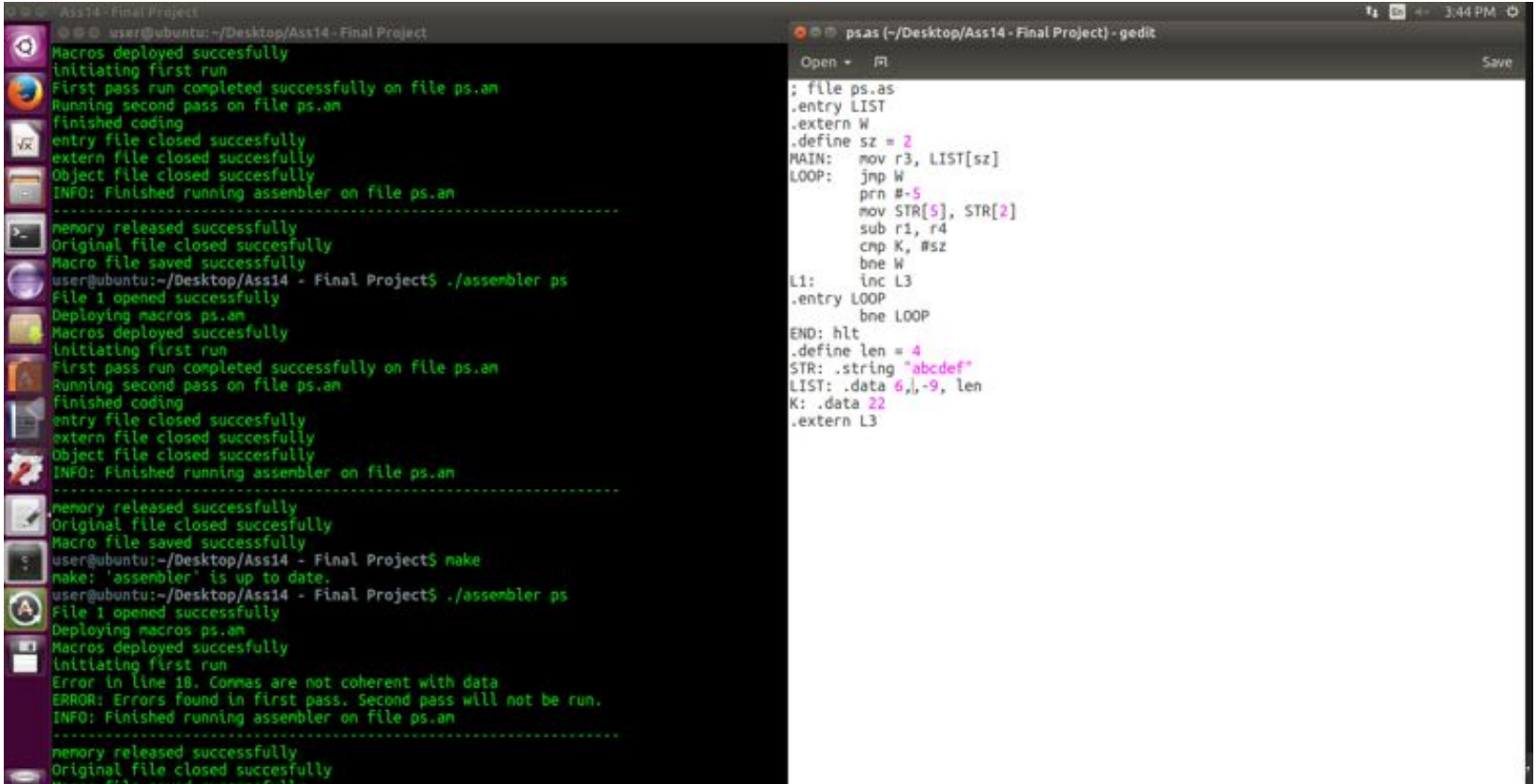
טיפול בשגיאות ומקרי קצה

עבור הקלט הבא:

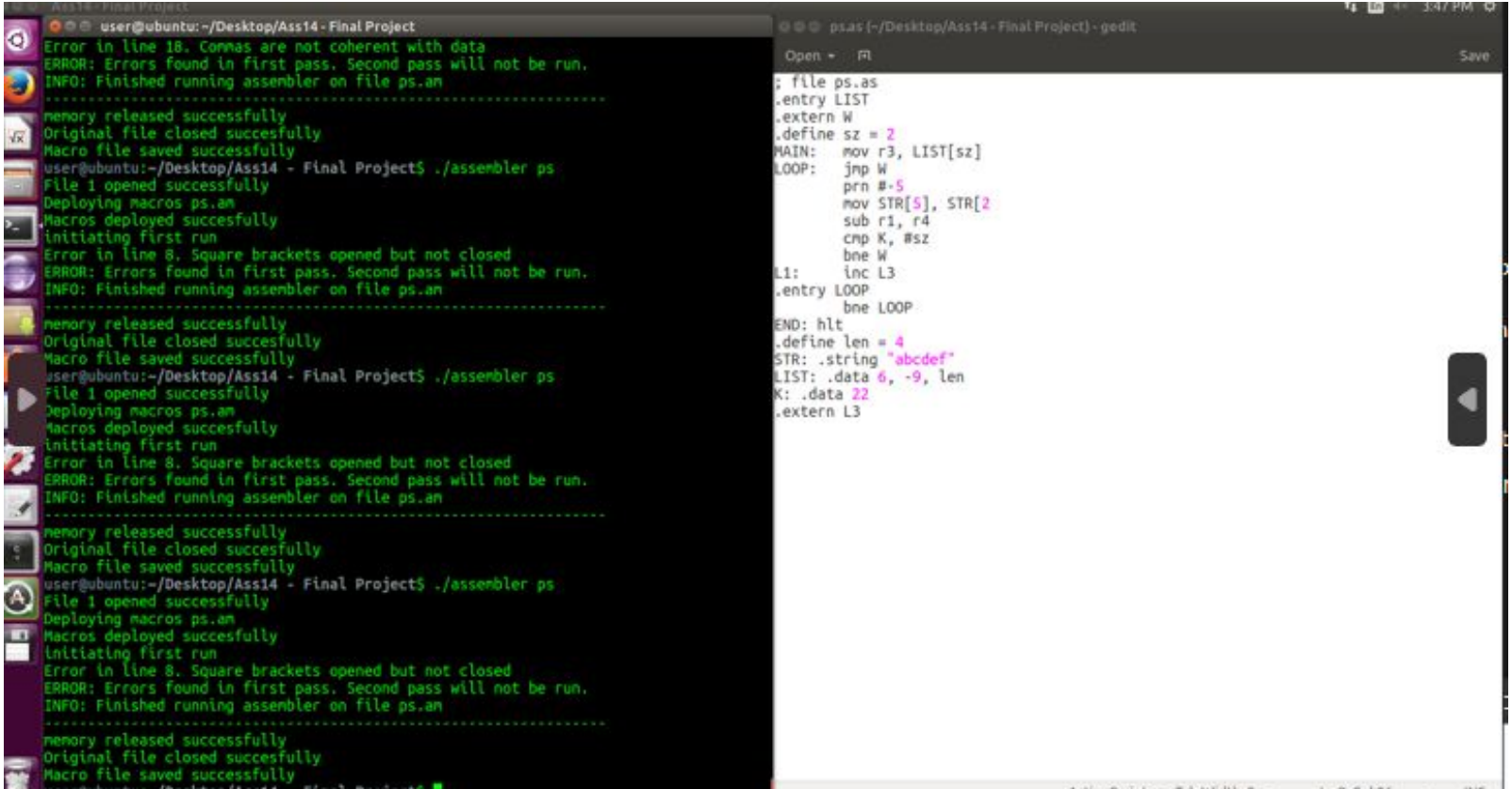


ריצה תקינה, ללא השפעה של כמות הרווחים בין המילים

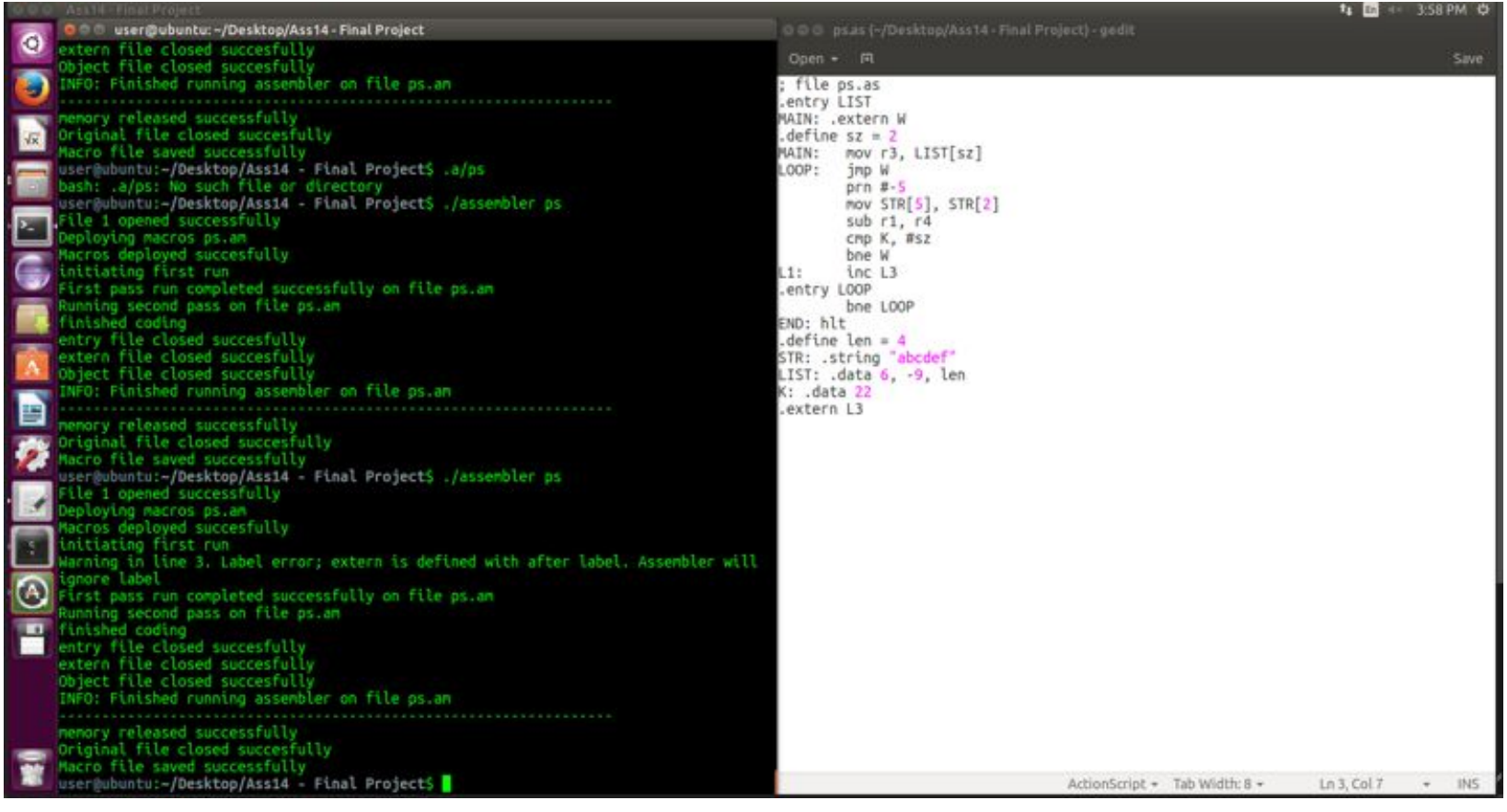
מספר פסיקים לא חוקי



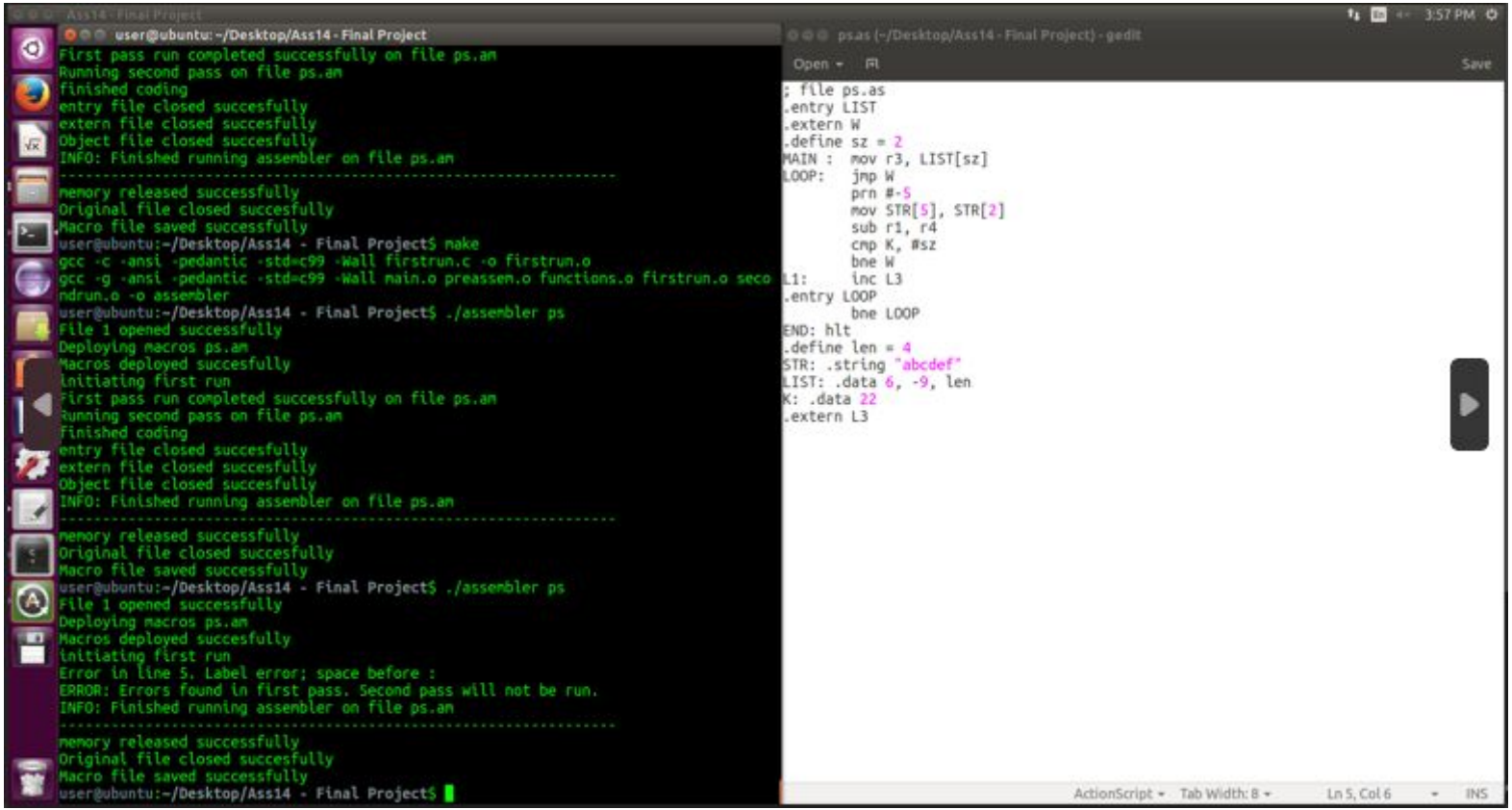
סוגר מרובע לא סגור



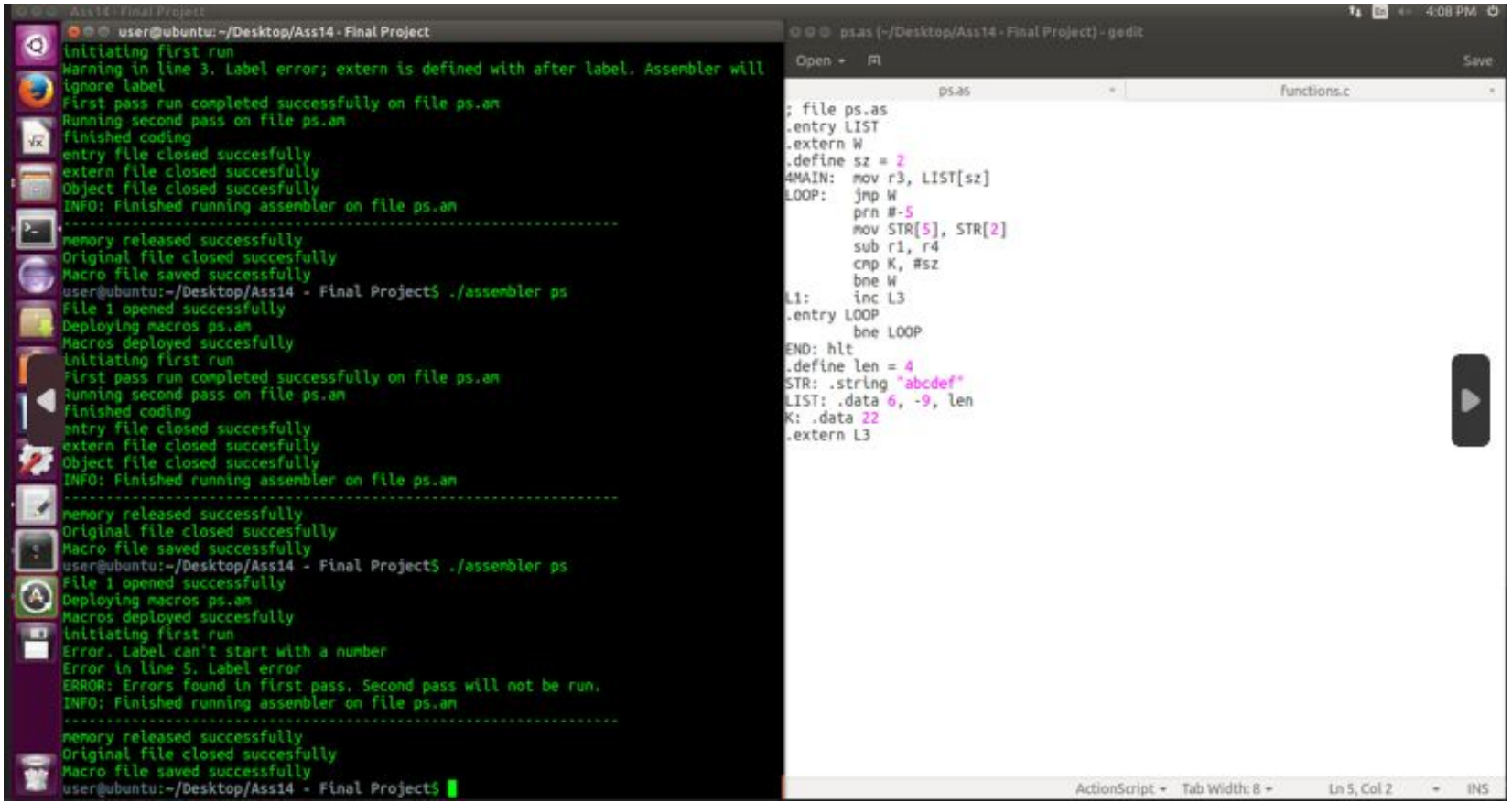
שגיאות תווית - extern after label



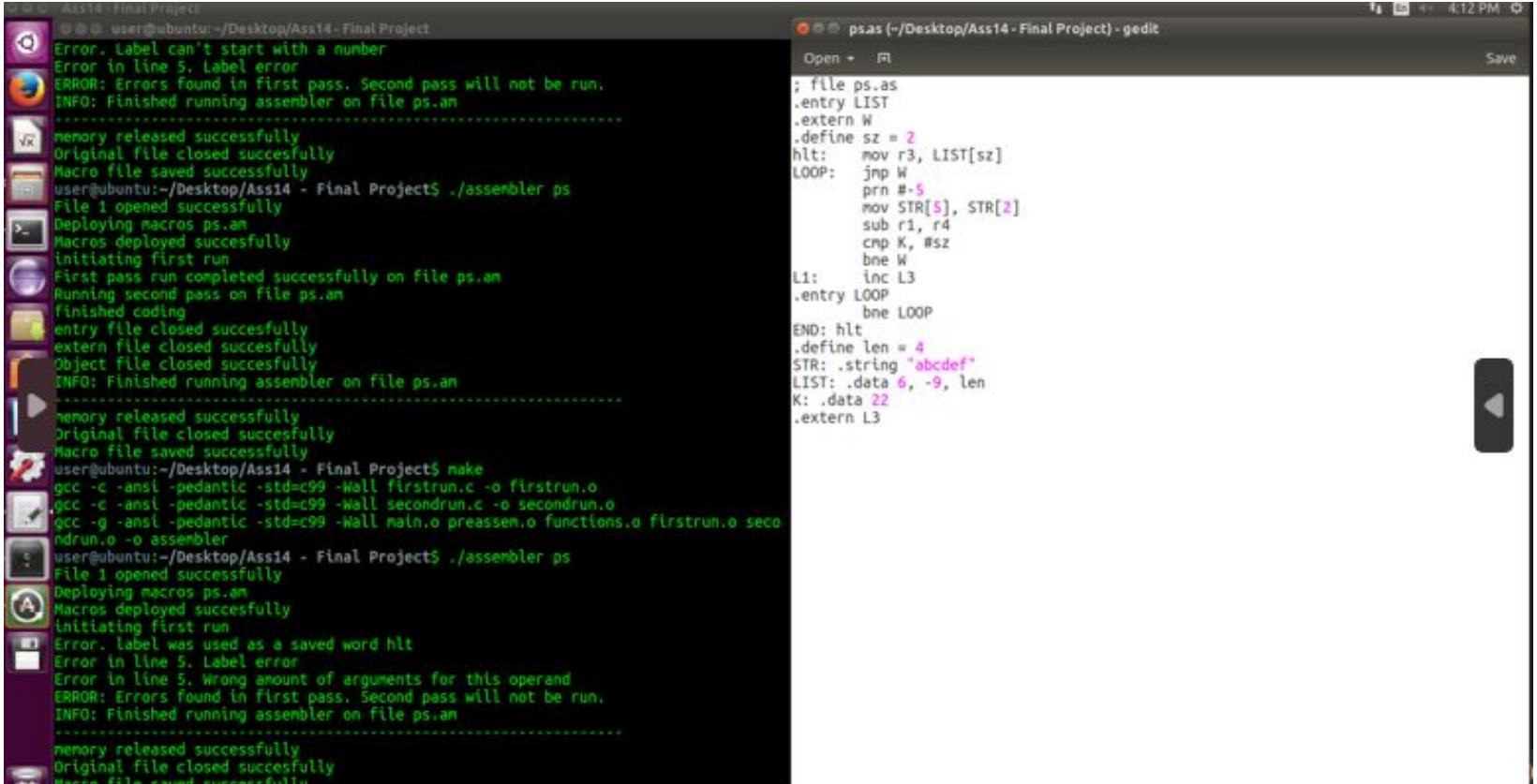
שגיאות תווית - רווח לפני :



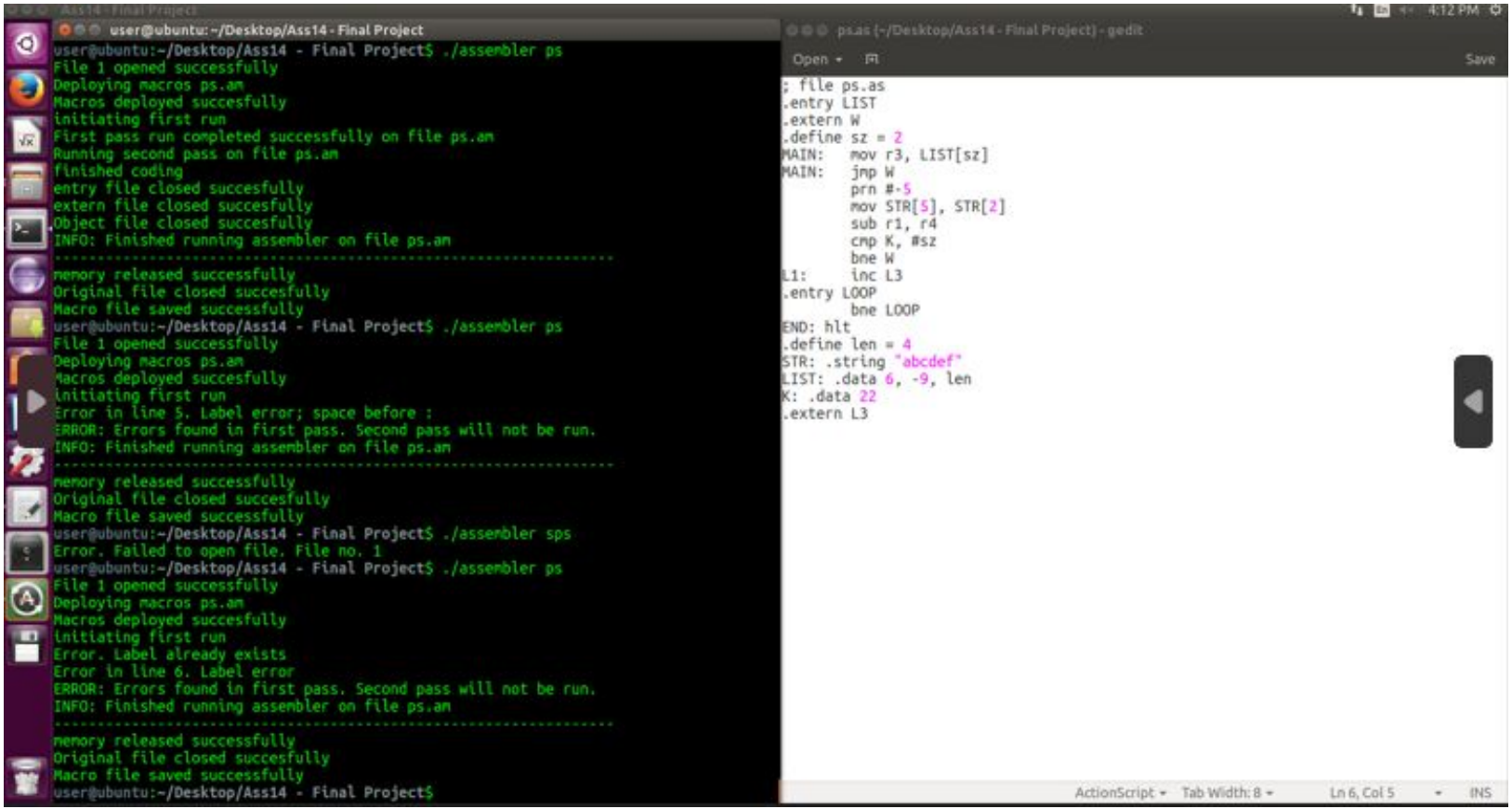
שגיאות תווית - תווית מתחילה במספר



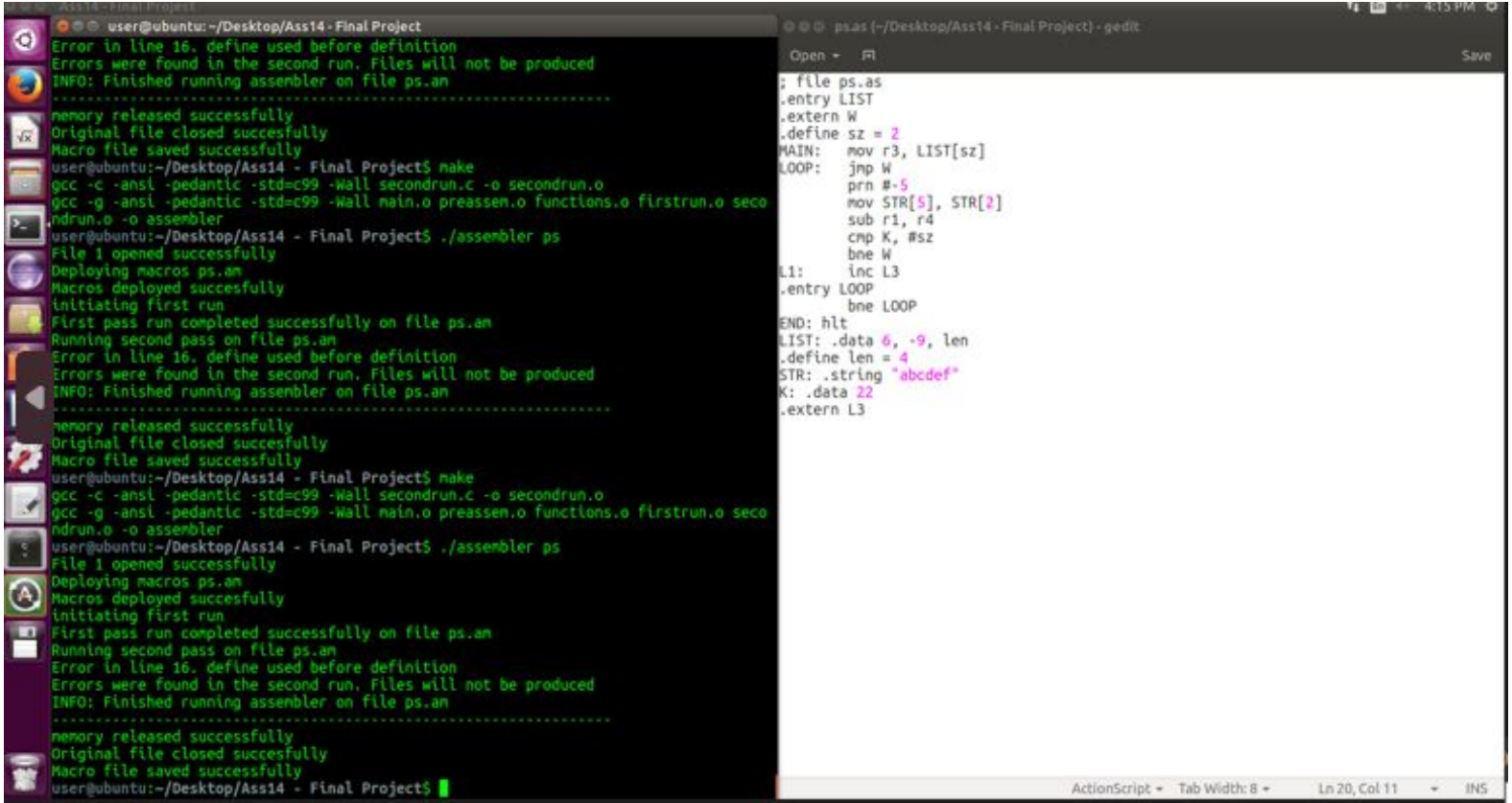
שגיאות תווית - מילה שמורה



שגיאות תווית - תווית קיימת



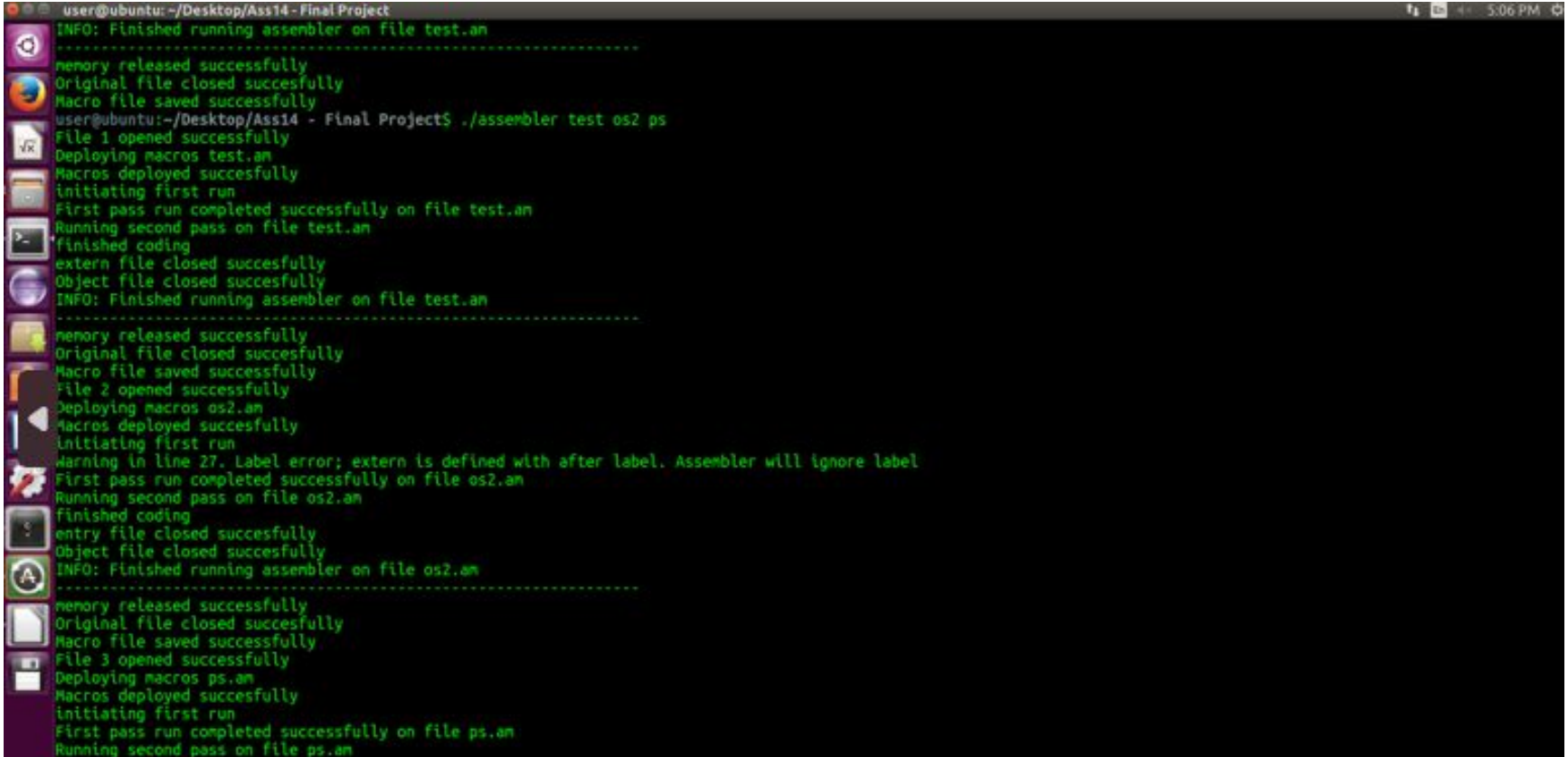
שגיאות define - define בשימוש לפני הגדרה



גילוי מספר שגיאות יחד

```
user@ubuntu:~/Desktop/Ass14 - Final Project$ ./assembler ps
File 1 opened successfully
Deploying macros ps.am
Macros deployed succesfully
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 succesfully
Macro file saved successfully
```

מספר הרצות על קלטים שונים (כולם בתיקייה)



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.

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