

Activities Sublime Text Sep 30 19:01

~/EE1103 program files/Exercise-5: LU decomposition/auto.sh - Sublime Text (UNREGISTERED)

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auto.sh

```
1 #!/bin/bash
2
3 echo "" > errorplot.txt
4 echo "" > profiledata.txt
5 echo "" > profiledata2.txt
6 awk '{ $1 = $1; print $1"\t"$2}' assignment_2.txt > original.txt
7 awk '{ if(NR<1001){ $1 = $1; print $1"\t"$2 } }' assignment_2.txt > newdata.txt
8 #The file path of the datafile must be free of any spaces (In this case, the file was in the same working directory. So the full file path isn't needed.)
9 #Hence, when you run this bash script, please provide a space-free file path (or) just create a copy of the dataset in the PWD.
10 # All the other files created when this bash script is run, will be created in the present working directory.
11 # So we don't need to specify their paths in the ./a.out command or the gnuplot command.
12 # Also, only the first 1000 rows from the original file is extracted for space constraints.
13
14 gcc LUD_Cubspline_Errorvsg.c -lm -o errorvsg #The "Error vs G" printing C code is compiled
15 gcc LUD_Cubspline_Inoutinterpol.c -lm -o inoutintpol #The "Input, Output and Interpolated output" printing C code is compiled
16
17 for i in {1..8}
18 do
19     var=$(( 2 ** i))
20     ./errorvsg $var newdata.txt >> errorplot.txt
21     #The executable file is ran for different downsampling constants (in this case they are the powers of 2 between 2 and 256)
22 done
23
24 ./inoutintpol 2 newdata.txt > interpg2.txt
25 #Interpolation with g=2
26 ./inoutintpol 16 newdata.txt > interpg16.txt
27 #Interpolation with g=16
28 ./inoutintpol 256 newdata.txt > interpg256.txt
29 #Interpolation with g=256
30
31 #The following commands are used to call the gnuplot commands within the bash script. The 'Error plot' and 'Original vs interpolation' plots for some downsampling
32 #constants are plotted using these commands
33 gnuplot -persist <<-EOFMarker
34 set title 'Error vs G'
35 set xlabel 'Downsampling constant(G)'
36 set ylabel 'Mean squared error(E)'
37 plot 'errorplot.txt' with lines title 'Error plot' linestyle 1
38 EOFMarker
39
40 for FILE in "interpg2.txt" "interpg16.txt" "interpg256.txt"
41 do
42     gnuplot -persist <<-EOFMarker
43     set title 'Original vs Interpolation'
44     set xlabel 'Time(Input)'
45     set ylabel 'Output'
46     plot '$FILE' using 1:2 with lines title 'Original' linestyle 1, \
47         '$FILE' using 1:3 with lines title 'Interpolation' linestyle 2
48     EOFMarker
49 done
50
51
52
53
54
55
```

Line 57, Column 1

Tab Size: 4 Bourne Again Shell (bash)

Bash script

Gnuplot part

Activities Sublime Text

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auto.sh profiledata.txt profiledata2.txt

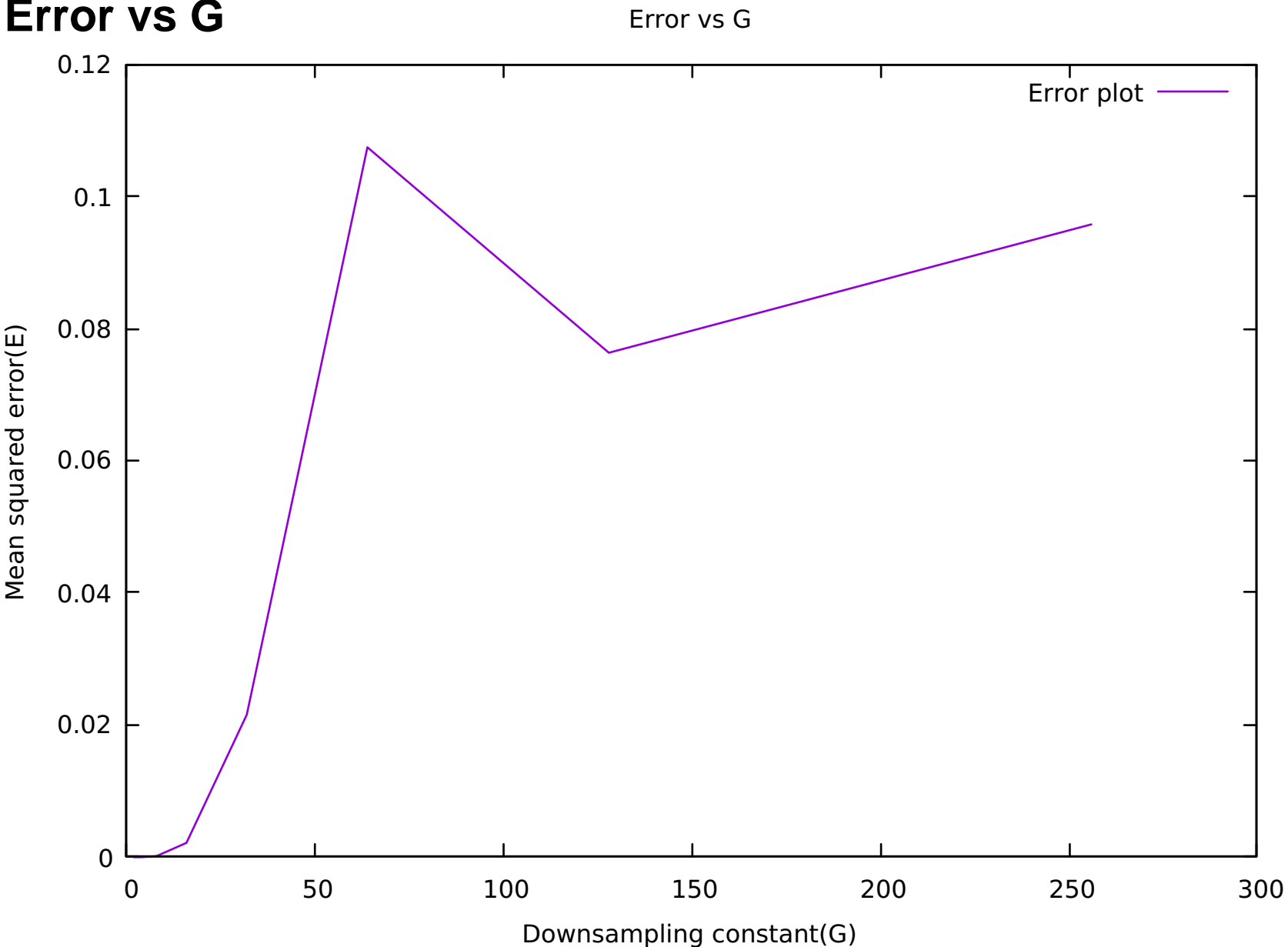
```
56
57 #The following commands are used to obtain the profile data.
58
59 #profiledata.txt contains profiling data about the Cubic spline code
60 #profiledata2.txt contains profiling data about the Linear spline code submitted last week. So when you run this code, make sure that the copy of the linear spline
61 #code is present in the PWD
62
63 gcc -Wall -std=c99 -pg LUD_Cubspline_Errorvsg.c -lm -o errorprofiling
64
65 ./errorprofiling 90 original.txt
66 gprof errorprofiling gmon.out >> profiledata.txt
67
68 ./errorprofiling 200 original.txt
69 gprof errorprofiling gmon.out >> profiledata.txt
70
71 ./errorprofiling 700 original.txt
72 gprof errorprofiling gmon.out >> profiledata.txt
73
74 gcc -Wall -std=c99 -pg EE19B138_interp.c -lm -o errorprofiling
75
76 ./errorprofiling 90 original.txt
77 gprof errorprofiling gmon.out >> profiledata2.txt
78
79 ./errorprofiling 200 original.txt
80 gprof errorprofiling gmon.out >> profiledata2.txt
81
82 ./errorprofiling 700 original.txt
83 gprof errorprofiling gmon.out >> profiledata2.txt
84
```

Gprof part

Line 46, Column 38

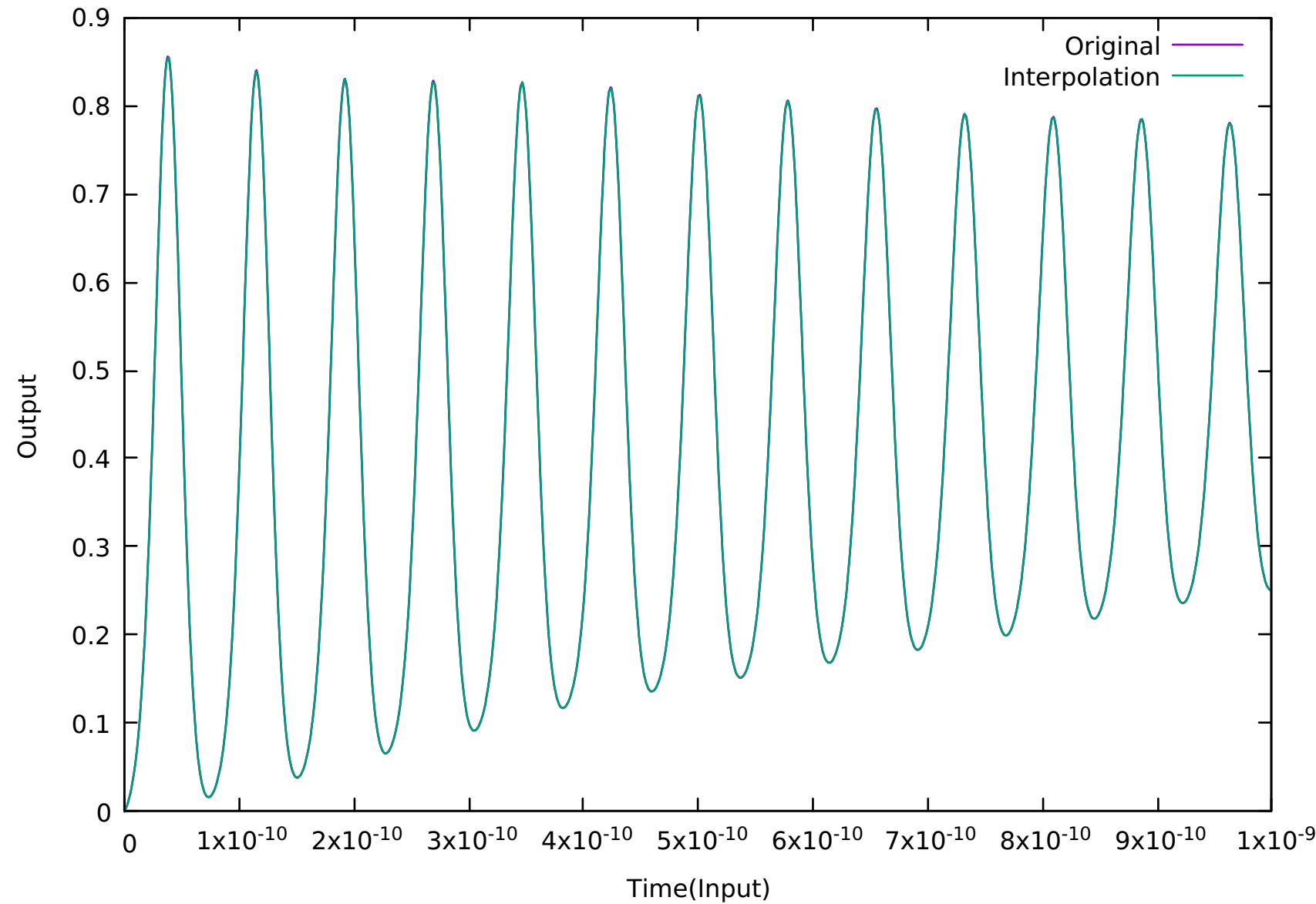
Tab Size: 4 Bourne Again Shell (bash)

Error vs G



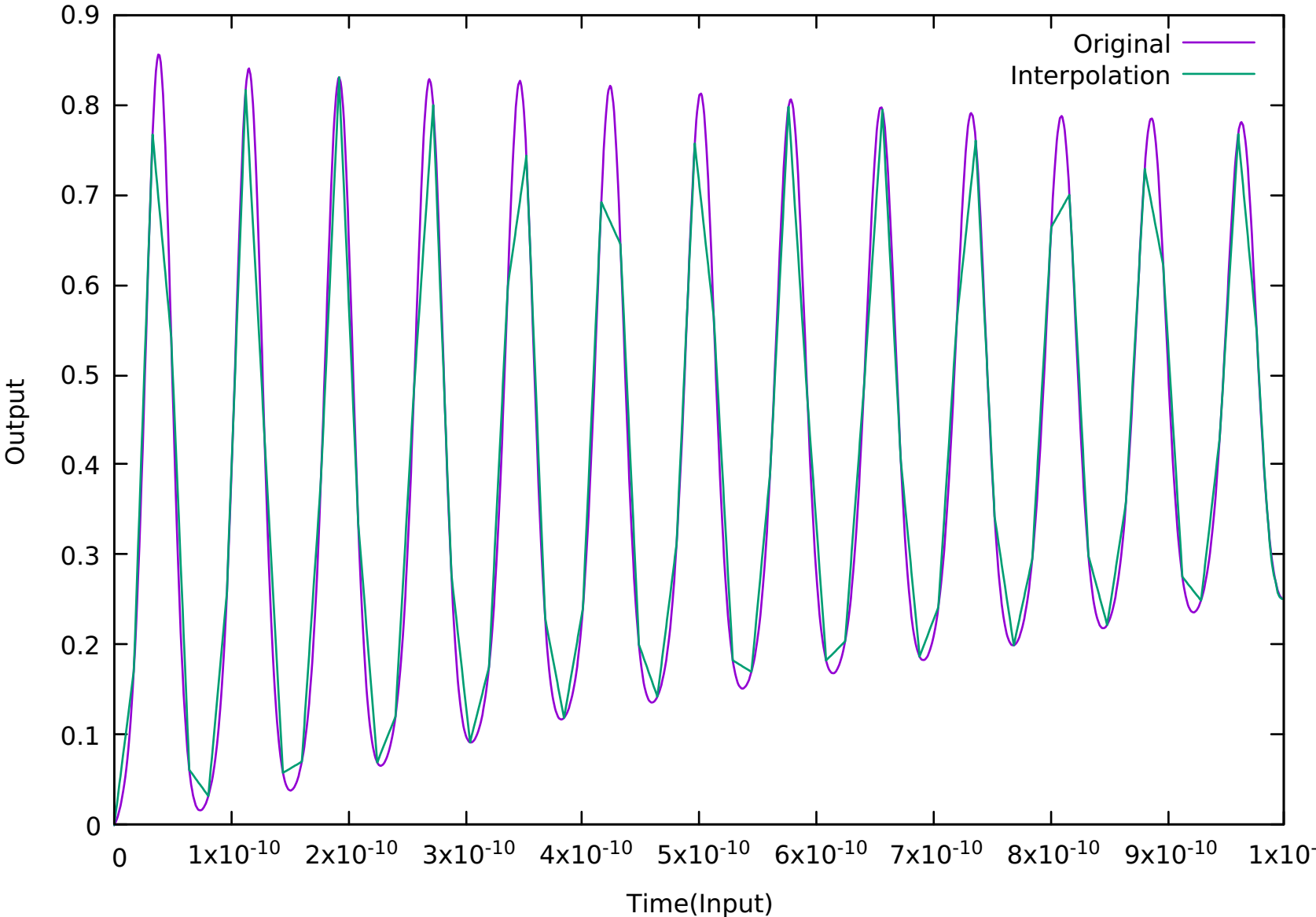
G = 2

Original vs Interpolation



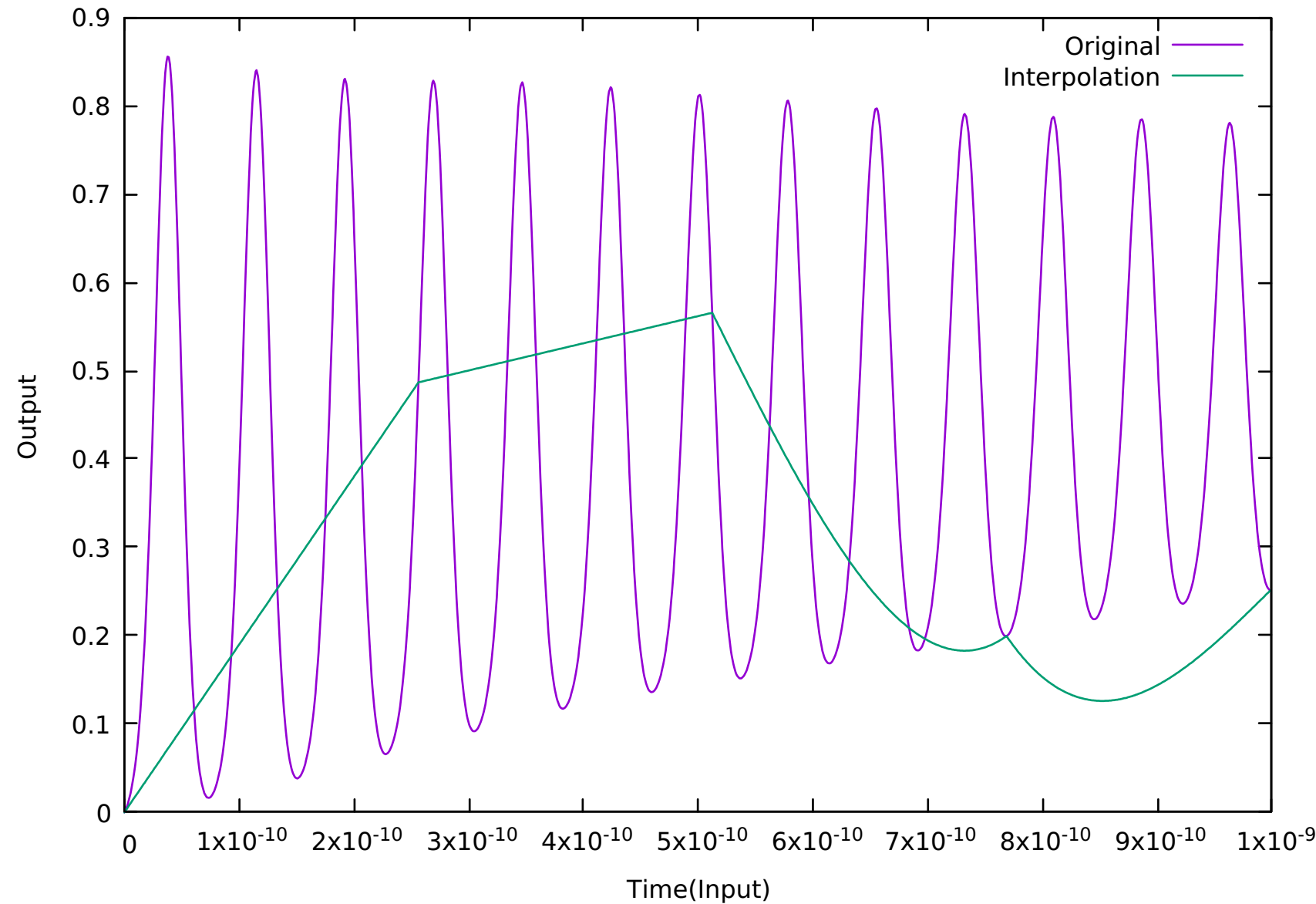
G = 16

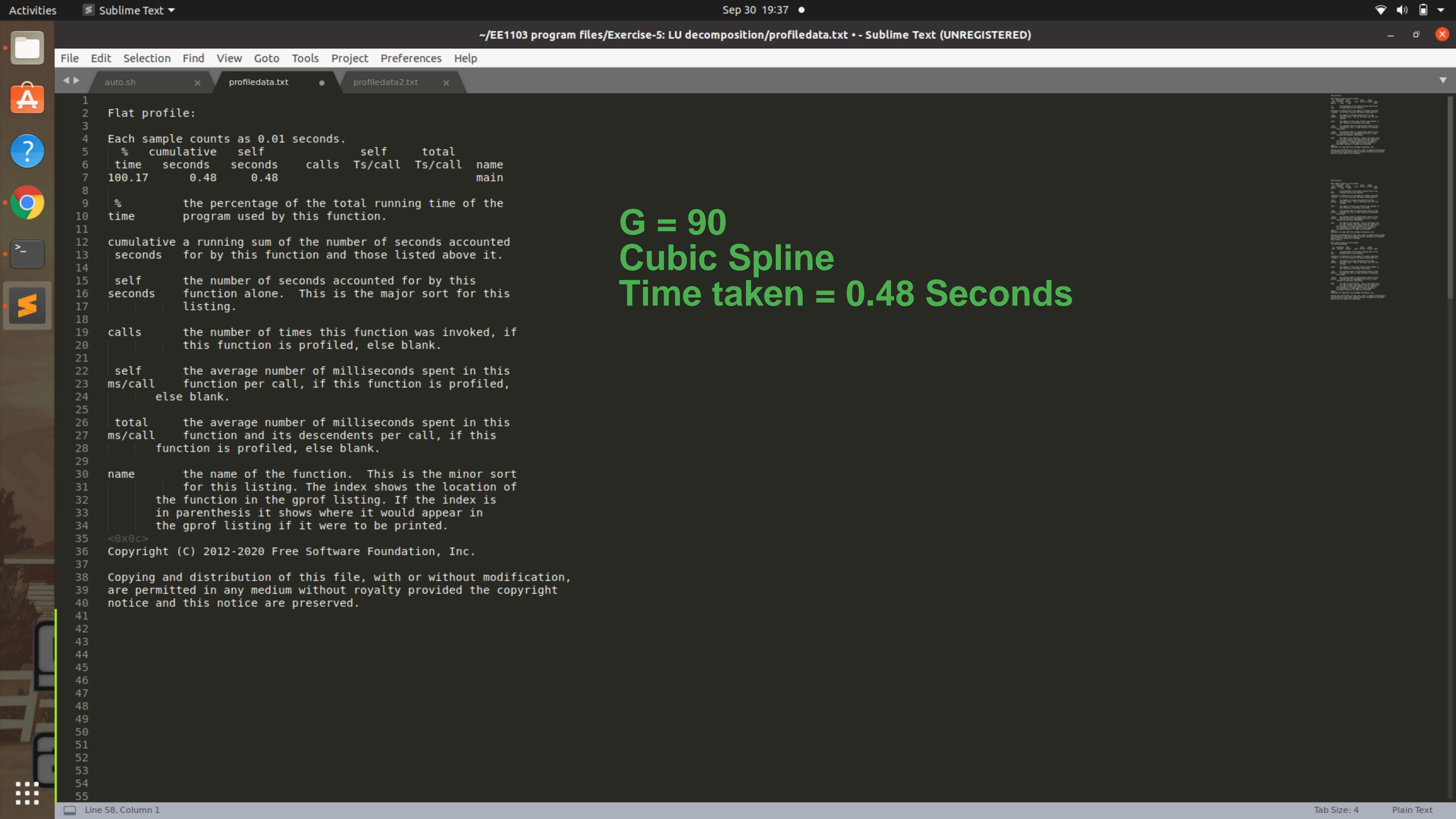
Original vs Interpolation



G = 256

Original vs Interpolation



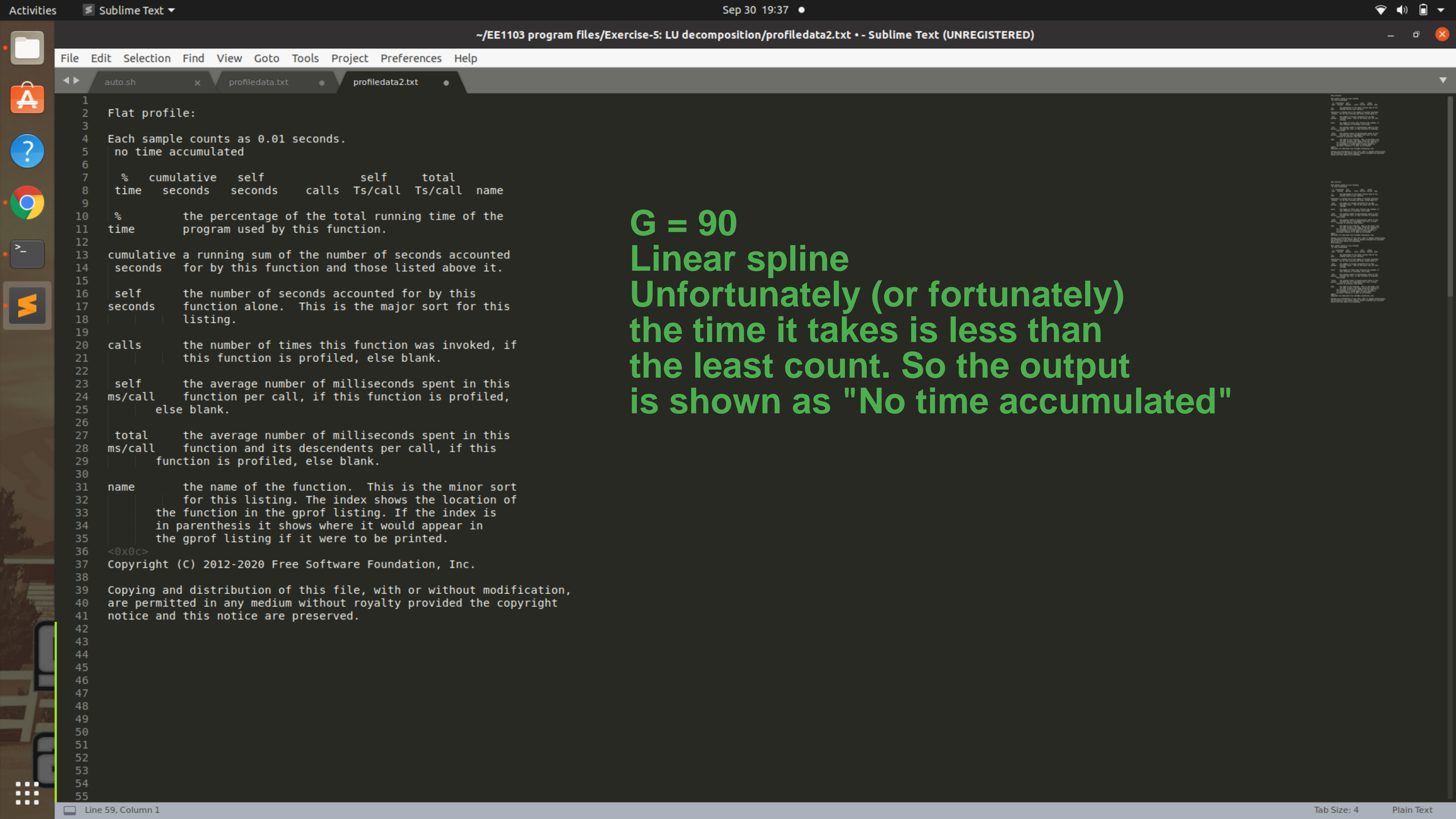


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auto.sh x profiledata.txt x profiledata2.txt x

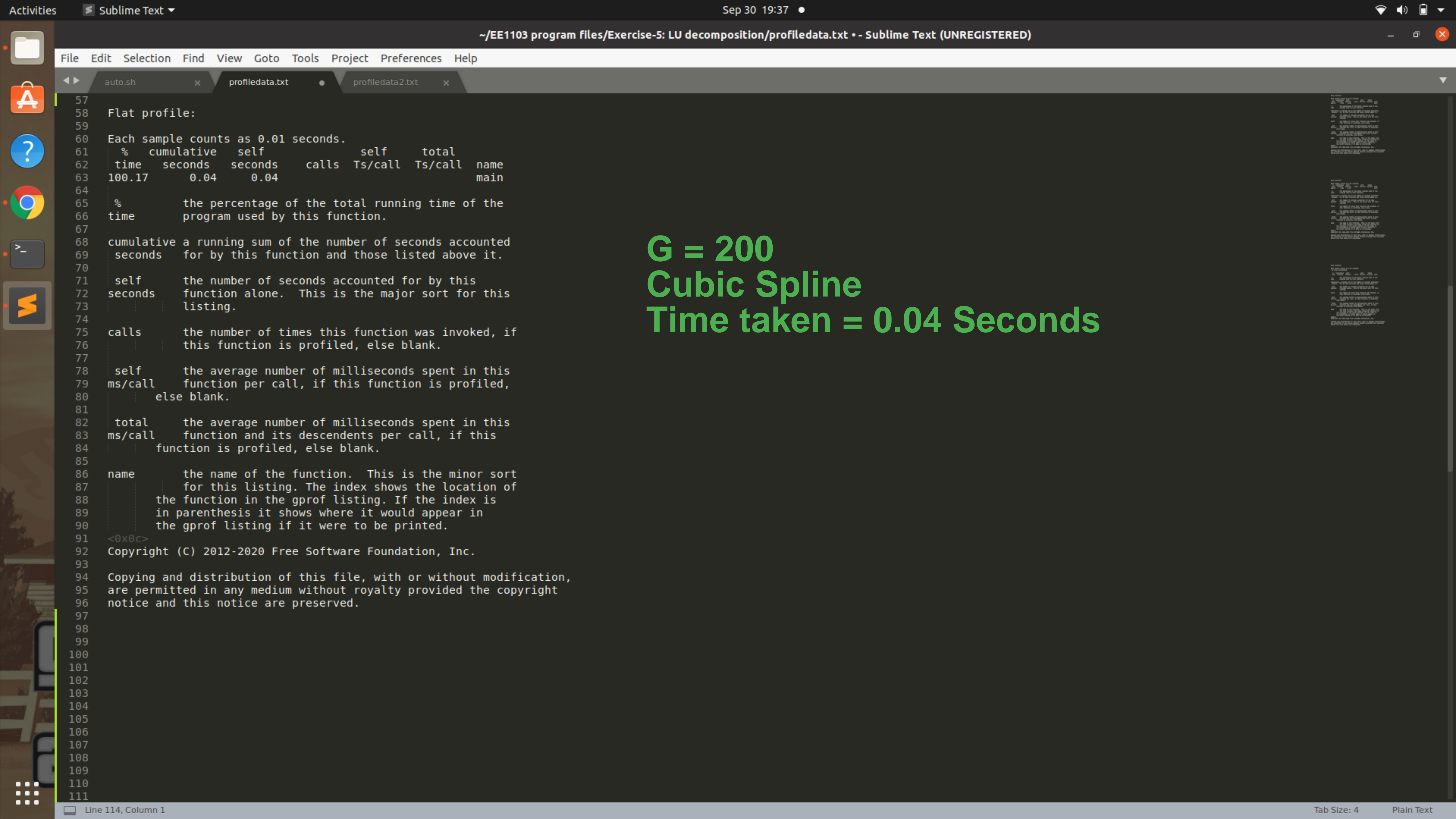
```
1
2 Flat profile:
3
4 Each sample counts as 0.01 seconds.
5 % cumulative self self total
6 time seconds seconds calls Ts/call Ts/call name
7 100.17 0.48 0.48 main
8
9 % the percentage of the total running time of the
10 time program used by this function.
11
12 cumulative a running sum of the number of seconds accounted
13 seconds for by this function and those listed above it.
14
15 self the number of seconds accounted for by this
16 seconds function alone. This is the major sort for this
17 listing.
18
19 calls the number of times this function was invoked, if
20 this function is profiled, else blank.
21
22 self the average number of milliseconds spent in this
23 ms/call function per call, if this function is profiled,
24 else blank.
25
26 total the average number of milliseconds spent in this
27 ms/call function and its descendents per call, if this
28 function is profiled, else blank.
29
30 name the name of the function. This is the minor sort
31 for this listing. The index shows the location of
32 the function in the gprof listing. If the index is
33 in parenthesis it shows where it would appear in
34 the gprof listing if it were to be printed.
35 <0x0c>
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```

G = 90
Cubic Spline
Time taken = 0.48 Seconds



```
1
2 Flat profile:
3
4 Each sample counts as 0.01 seconds.
5 no time accumulated
6
7 % cumulative self self total
8 time seconds seconds calls Ts/call Ts/call name
9
10 % the percentage of the total running time of the
11 time program used by this function.
12
13 cumulative a running sum of the number of seconds accounted
14 seconds for by this function and those listed above it.
15
16 self the number of seconds accounted for by this
17 seconds function alone. This is the major sort for this
18 listing.
19
20 calls the number of times this function was invoked, if
21 this function is profiled, else blank.
22
23 self the average number of milliseconds spent in this
24 ms/call function per call, if this function is profiled,
25 else blank.
26
27 total the average number of milliseconds spent in this
28 ms/call function and its descendents per call, if this
29 function is profiled, else blank.
30
31 name the name of the function. This is the minor sort
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```

G = 90
Linear spline
Unfortunately (or fortunately)
the time it takes is less than
the least count. So the output
is shown as "No time accumulated"



G = 200
Cubic Spline
Time taken = 0.04 Seconds

Activities

Sublime Text

Sep 30 19:37

~ / EE1103 program files / Exercise-5: LU decomposition / profiledata2.txt • - Sublime Text (UNREGISTERED)

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auto.sh

profiledata.txt

profiledata2.txt

57

58

59 Flat profile:

60

61 Each sample counts as 0.01 seconds.

62 no time accumulated

63

64 % cumulative self self total

65 time seconds seconds calls Ts/call Ts/call name

66

67 %

68 time the percentage of the total running time of the

69 program used by this function.

70 cumulative a running sum of the number of seconds accounted

71 seconds for by this function and those listed above it.

72

73 self the number of seconds accounted for by this

74 seconds function alone. This is the major sort for this

75 listing.

76

77 calls the number of times this function was invoked, if

78 this function is profiled, else blank.

79

80 self the average number of milliseconds spent in this

81 ms/call function per call, if this function is profiled,

82 else blank.

83

84 total the average number of milliseconds spent in this

85 ms/call function and its descendents per call, if this

86 function is profiled, else blank.

87

88 name the name of the function. This is the minor sort

89 for this listing. The index shows the location of

90 the function in the gprof listing. If the index is

91 in parenthesis it shows where it would appear in

92 the gprof listing if it were to be printed.

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G = 200

Linear spline

Unfortunately (or fortunately)

the time it takes is less than

the least count. So the output

is shown as "No time accumulated"

Line 114, Column 1

Tab Size: 4 Plain Text

Activities

Sublime Text

Sep 30 19:37

~ / EE1103 program files / Exercise-5: LU decomposition / profiledata.txt • - Sublime Text (UNREGISTERED)

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auto.sh x profiledata.txt x profiledata2.txt x

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114 Flat profile:

115

116 Each sample counts as 0.01 seconds.

117 no time accumulated

118

119 % cumulative self self total

120 time seconds seconds calls Ts/call Ts/call name

121

122 %

123 time the percentage of the total running time of the

124 program used by this function.

125

126 cumulative a running sum of the number of seconds accounted

127 seconds for by this function and those listed above it.

128

129 self the number of seconds accounted for by this

130 seconds function alone. This is the major sort for this

131 listing.

132

133 calls the number of times this function was invoked, if

134 this function is profiled, else blank.

135

136 self the average number of milliseconds spent in this

137 ms/call function per call, if this function is profiled,

138 else blank.

139

140 total the average number of milliseconds spent in this

141 ms/call function and its descendents per call, if this

142 function is profiled, else blank.

143

144 name the name of the function. This is the minor sort

145 for this listing. The index shows the location of

146 the function in the gprof listing. If the index is

147 in parenthesis it shows where it would appear in

148 the gprof listing if it were to be printed.

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G = 700

Cubic Spline

In this case, for a large

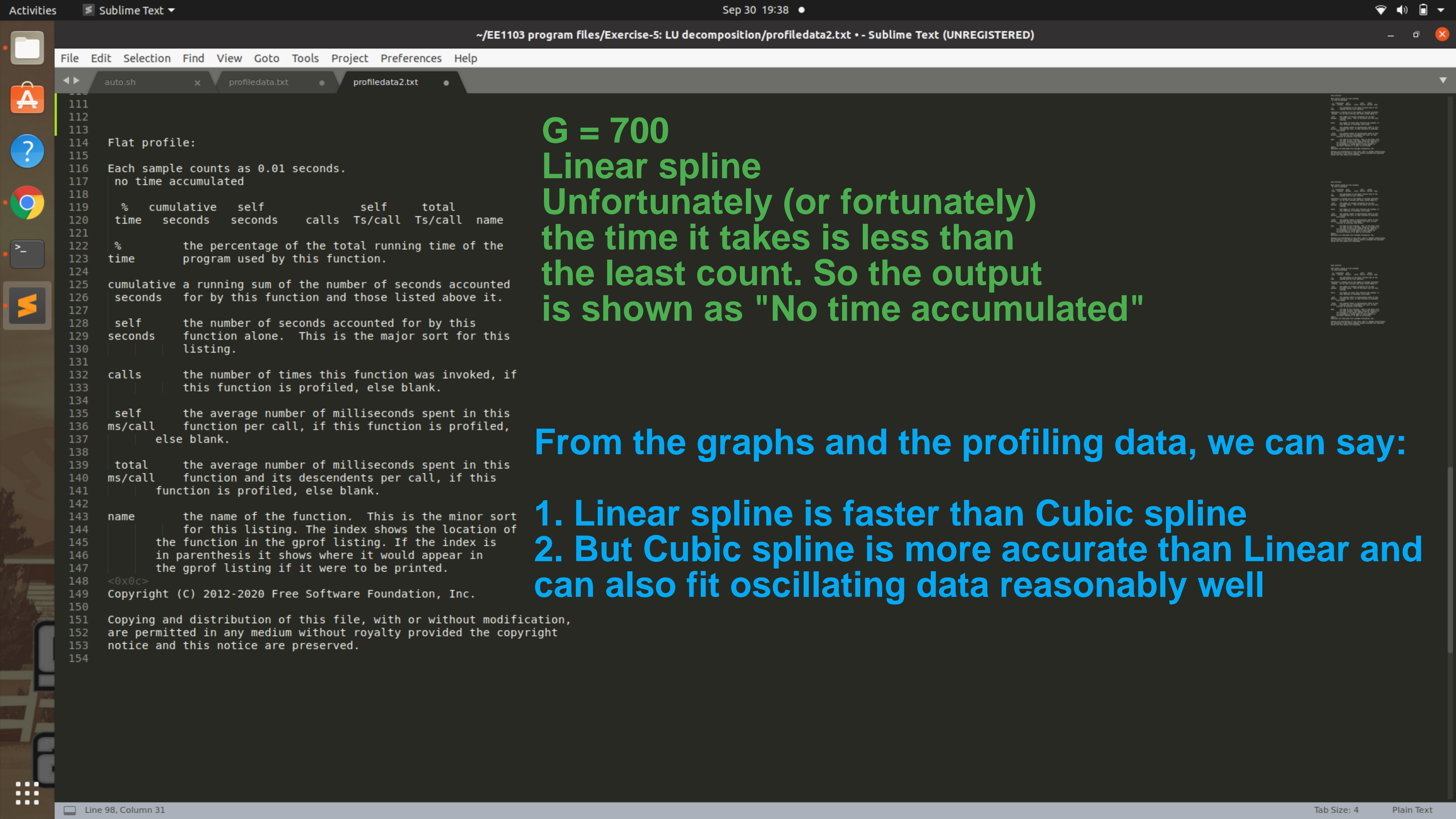
G like 700, the time taken

is again not calculated

as it is less than the least count

Line 104, Column 1

Tab Size: 4 Plain Text



G = 700
Linear spline
Unfortunately (or fortunately)
the time it takes is less than
the least count. So the output
is shown as "No time accumulated"

From the graphs and the profiling data, we can say:

1. Linear spline is faster than Cubic spline
2. But Cubic spline is more accurate than Linear and can also fit oscillating data reasonably well

```
File Edit Selection Find View Goto Tools Project Preferences Help
auto.sh x profiledata.txt profiledata2.txt
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112
113
114 Flat profile:
115
116 Each sample counts as 0.01 seconds.
117 no time accumulated
118
119 % cumulative self self total
120 time seconds seconds calls Ts/call Ts/call name
121
122 % the percentage of the total running time of the
123 time program used by this function.
124
125 cumulative a running sum of the number of seconds accounted
126 seconds for by this function and those listed above it.
127
128 self the number of seconds accounted for by this
129 seconds function alone. This is the major sort for this
130 listing.
131
132 calls the number of times this function was invoked, if
133 this function is profiled, else blank.
134
135 self the average number of milliseconds spent in this
136 ms/call function per call, if this function is profiled,
137 else blank.
138
139 total the average number of milliseconds spent in this
140 ms/call function and its descendents per call, if this
141 function is profiled, else blank.
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143 name the name of the function. This is the minor sort
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```