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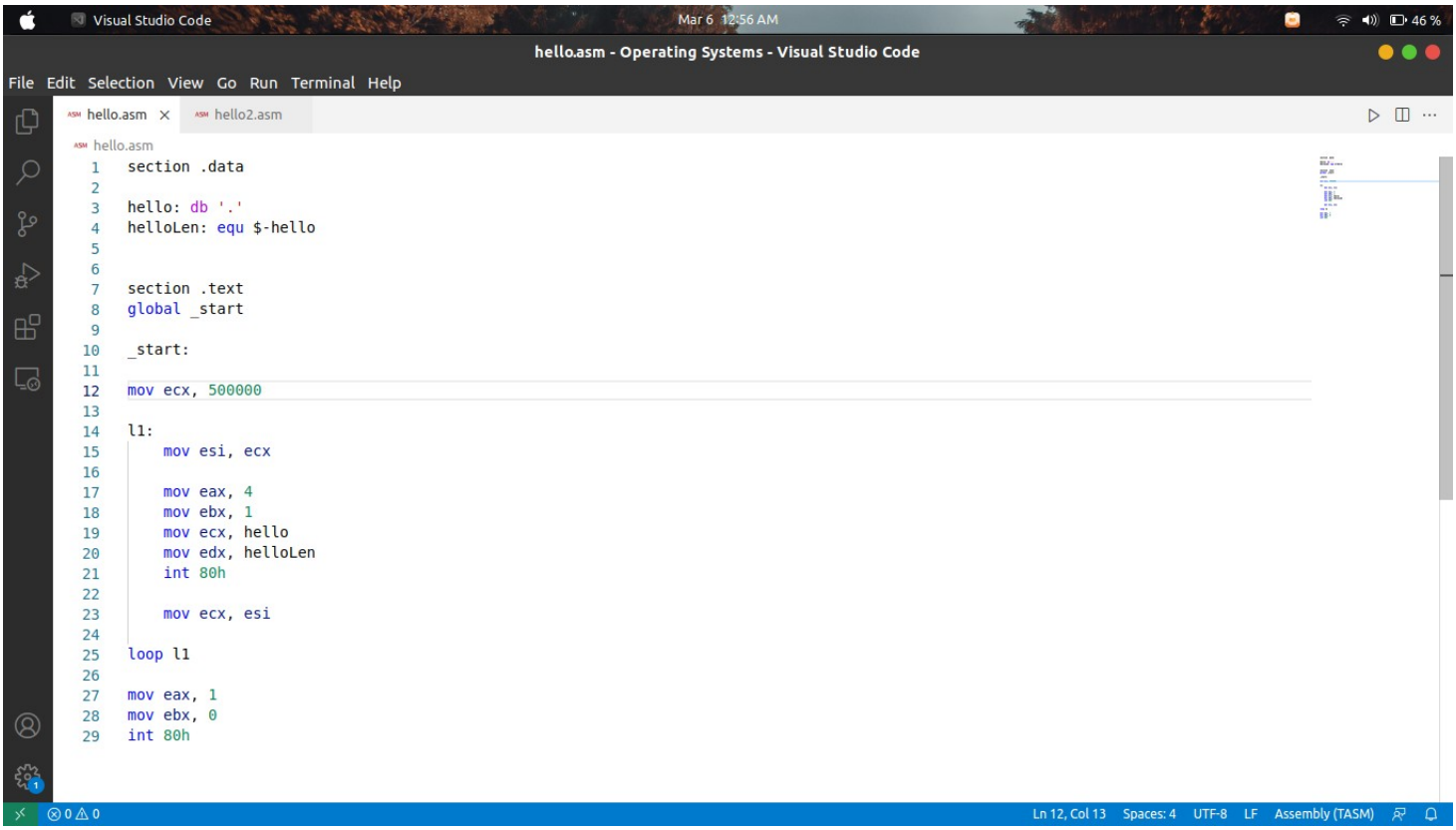
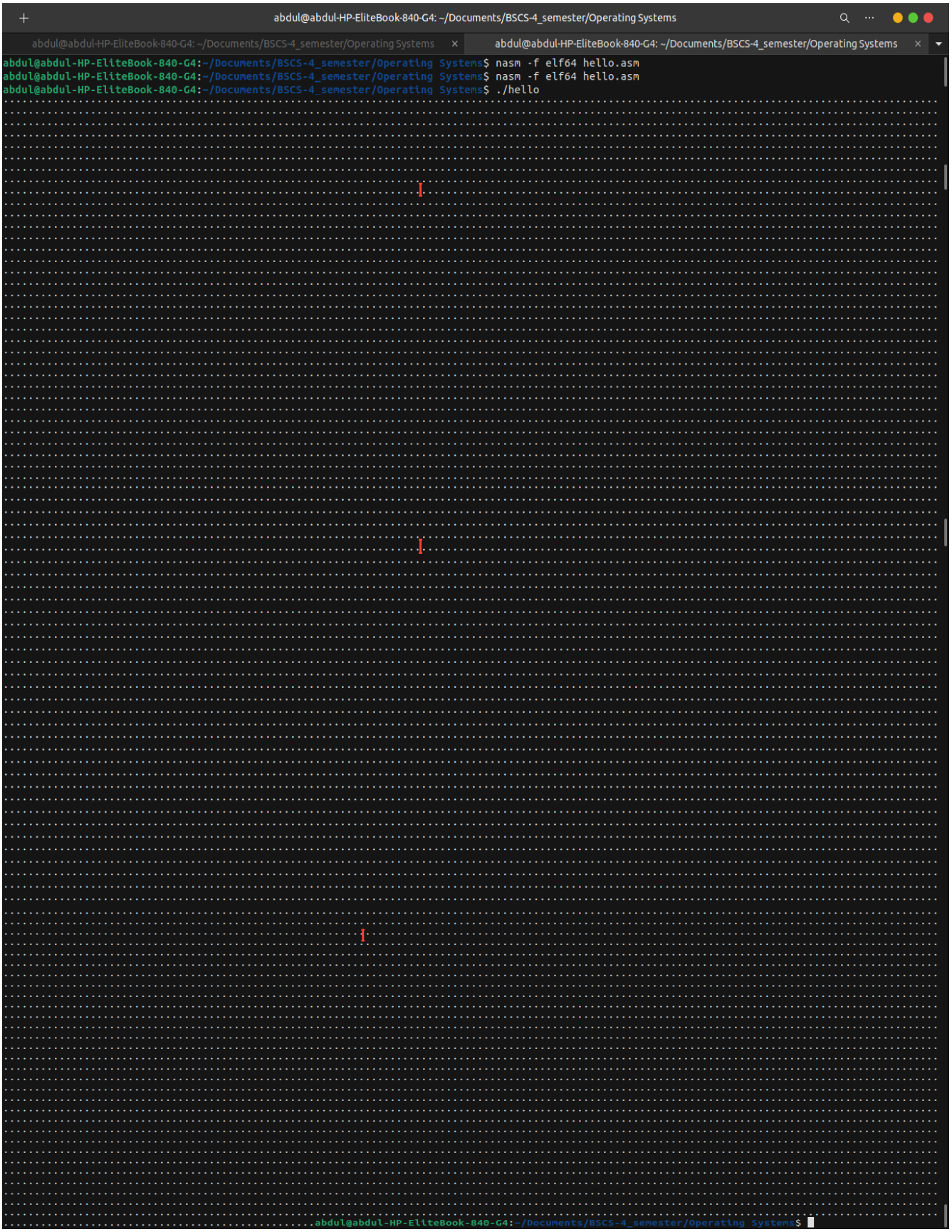
p200086 BSCS 4A

Tasks

Task1

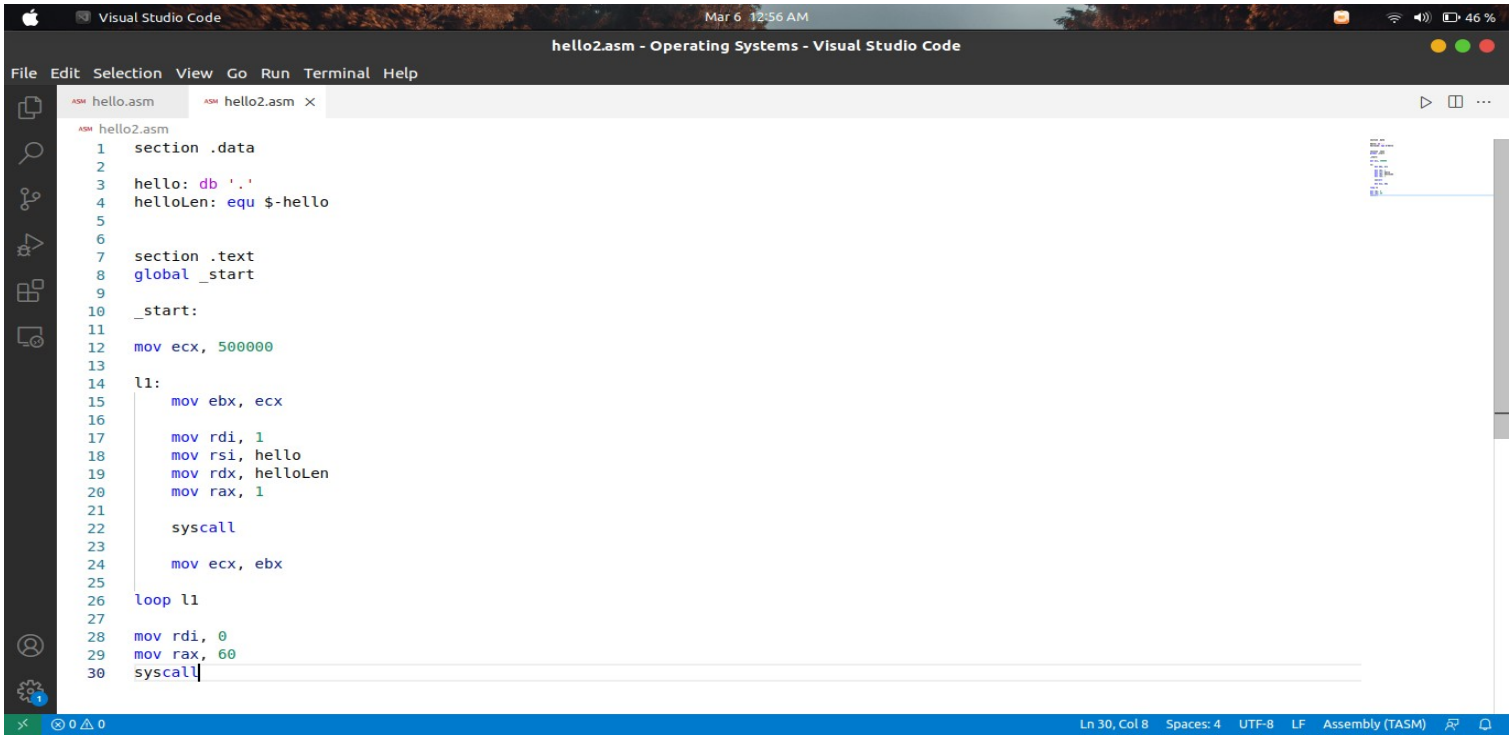



abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems
abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems
abdul@abdul-HP-EliteBook-840-G4: ~/Documents/BSCS-4_semester/Operating Systems
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ nasm -f elf64 hello.asm
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ nasm -f elf64 hello.asm
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ ./hello
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$

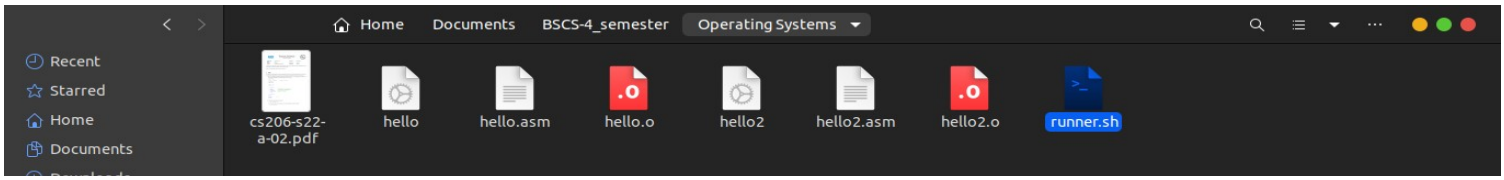
```
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ time ./hello > /dev/null

real    0m0.411s
user    0m0.239s
sys     0m0.171s
```

Task2

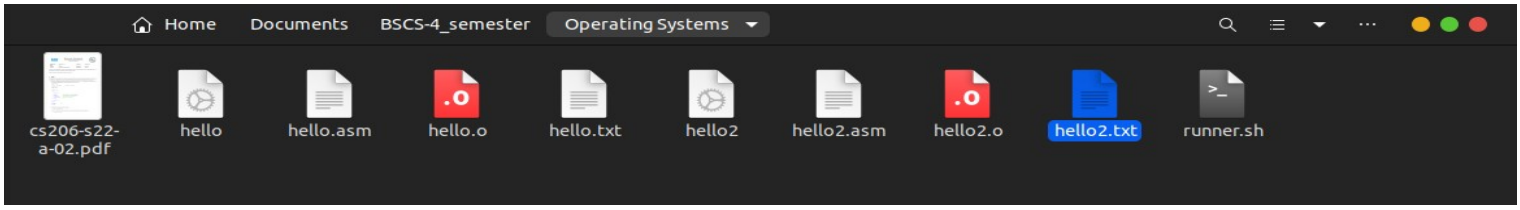



```
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ nasm -f elf64 -o hello.o hello.asm
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ nasm -f elf64 -o hello2.o hello2.asm
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ ld -s -o hello hello.o
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ ld -s -o hello2 hello2.o
```




```
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ chmod +x runner.sh
abdul@abdul-HP-EliteBook-840-G4:~/Documents/BSCS-4_semester/Operating Systems$ ./runner.sh
```

hello.txt & hello2.txt → files created



Text files

Open + hello2.txt ~/Documents/BSCS-4_semester/Operating Systems Save

```
real    0m0.323s
user    0m0.170s
sys     0m0.153s

real    0m0.303s
user    0m0.166s
sys     0m0.137s

real    0m0.319s
user    0m0.182s
sys     0m0.138s

real    0m0.317s
user    0m0.228s
sys     0m0.088s

real    0m0.316s
user    0m0.168s
sys     0m0.148s

real    0m0.308s
user    0m0.200s
sys     0m0.108s

real    0m0.321s
user    0m0.184s
sys     0m0.136s

real    0m0.313s
user    0m0.197s
sys     0m0.116s

real    0m0.315s
user    0m0.196s
sys     0m0.120s

real    0m0.310s
user    0m0.175s
sys     0m0.135s

real    0m0.312s
user    0m0.196s
sys     0m0.116s

real    0m0.321s
user    0m0.241s
sys     0m0.080s

real    0m0.319s
user    0m0.188s
sys     0m0.131s

real    0m0.308s
user    0m0.148s
sys     0m0.160s

real    0m0.318s
user    0m0.185s
sys     0m0.133s

real    0m0.332s
user    0m0.168s
sys     0m0.163s

real    0m0.317s
user    0m0.153s
sys     0m0.164s

real    0m0.319s
user    0m0.180s
sys     0m0.139s
```

Open + hello.txt ~/Documents/BSCS-4_semester/Operating Systems Save

```
real    0m0.443s
user    0m0.254s
sys     0m0.190s

real    0m0.431s
user    0m0.210s
sys     0m0.221s

real    0m0.432s
user    0m0.232s
sys     0m0.200s

real    0m0.421s
user    0m0.232s
sys     0m0.187s

real    0m0.422s
user    0m0.245s
sys     0m0.177s

real    0m0.431s
user    0m0.280s
sys     0m0.152s

real    0m0.431s
user    0m0.264s
sys     0m0.168s

real    0m0.416s
user    0m0.268s
sys     0m0.148s

real    0m0.419s
user    0m0.232s
sys     0m0.187s

real    0m0.420s
user    0m0.244s
sys     0m0.176s

real    0m0.425s
user    0m0.239s
sys     0m0.187s

real    0m0.422s
user    0m0.258s
sys     0m0.163s

real    0m0.420s
user    0m0.212s
sys     0m0.208s

real    0m0.430s
user    0m0.259s
sys     0m0.171s

real    0m0.428s
user    0m0.268s
sys     0m0.160s

real    0m0.424s
user    0m0.243s
sys     0m0.179s

real    0m0.419s
user    0m0.200s
sys     0m0.219s

real    0m0.419s
user    0m0.256s
sys     0m0.164s
```

```
 72 sys     0m0.139s
 73
 74 real    0m0.313s
 75 user    0m0.178s
 76 sys     0m0.134s
 77
 78 real    0m0.318s
 79 user    0m0.165s
 80 sys     0m0.150s
 81
 82 real    0m0.314s
 83 user    0m0.149s
 84 sys     0m0.165s
 85
 86 real    0m0.313s
 87 user    0m0.168s
 88 sys     0m0.144s
 89
 90 real    0m0.314s
 91 user    0m0.191s
 92 sys     0m0.123s
 93
 94 real    0m0.320s
 95 user    0m0.191s
 96 sys     0m0.127s
 97
 98 real    0m0.321s
 99 user    0m0.185s
100 sys     0m0.136s
101
102 real    0m0.317s
103 user    0m0.181s
104 sys     0m0.136s
105
106 real    0m0.326s
```

```
 72 sys     0m0.164s
 73
 74 real    0m0.426s
 75 user    0m0.245s
 76 sys     0m0.181s
 77
 78 real    0m0.423s
 79 user    0m0.247s
 80 sys     0m0.175s
 81
 82 real    0m0.417s
 83 user    0m0.245s
 84 sys     0m0.172s
 85
 86 real    0m0.421s
 87 user    0m0.197s
 88 sys     0m0.224s
 89
 90 real    0m0.423s
 91 user    0m0.255s
 92 sys     0m0.166s
 93
 94 real    0m0.420s
 95 user    0m0.232s
 96 sys     0m0.188s
 97
 98 real    0m0.418s
 99 user    0m0.241s
100 sys     0m0.177s
101
102 real    0m0.476s
103 user    0m0.260s
104 sys     0m0.216s
105
106 real    0m0.440s
```

```
106 real    0m0.326s
107 user    0m0.217s
108 sys     0m0.108s
109
110 real    0m0.335s
111 user    0m0.171s
112 sys     0m0.163s
113
114 real    0m0.319s
115 user    0m0.193s
116 sys     0m0.125s
117
118 real    0m0.351s
119 user    0m0.217s
120 sys     0m0.133s
121
122 real    0m0.346s
123 user    0m0.191s
124 sys     0m0.155s
125
126 real    0m0.327s
127 user    0m0.230s
128 sys     0m0.097s
129
130 real    0m0.318s
131 user    0m0.186s
132 sys     0m0.130s
133
134 real    0m0.327s
135 user    0m0.182s
136 sys     0m0.145s
137
138 real    0m0.319s
139 user    0m0.228s
140 sys     0m0.092s
141
```

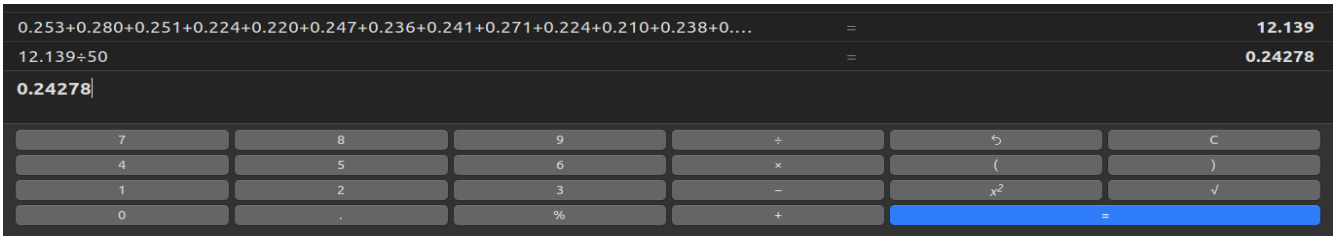
```
106 real    0m0.440s
107 user    0m0.236s
108 sys     0m0.204s
109
110 real    0m0.464s
111 user    0m0.296s
112 sys     0m0.168s
113
114 real    0m0.434s
115 user    0m0.242s
116 sys     0m0.193s
117
118 real    0m0.468s
119 user    0m0.248s
120 sys     0m0.219s
121
122 real    0m0.433s
123 user    0m0.249s
124 sys     0m0.184s
125
126 real    0m0.422s
127 user    0m0.205s
128 sys     0m0.217s
129
130 real    0m0.430s
131 user    0m0.239s
132 sys     0m0.191s
133
134 real    0m0.417s
135 user    0m0.201s
136 sys     0m0.216s
137
138 real    0m0.420s
139 user    0m0.228s
140 sys     0m0.192s
141
```

```
142 real    0m0.323s
143 user    0m0.167s
144 sys     0m0.155s
145
146 real    0m0.326s
147 user    0m0.189s
148 sys     0m0.136s
149
150 real    0m0.322s
151 user    0m0.182s
152 sys     0m0.141s
153
154 real    0m0.321s
155 user    0m0.198s
156 sys     0m0.123s
157
158 real    0m0.308s
159 user    0m0.200s
160 sys     0m0.108s
161
162 real    0m0.330s
163 user    0m0.167s
164 sys     0m0.163s
165
166 real    0m0.349s
167 user    0m0.208s
168 sys     0m0.140s
169
170 real    0m0.335s
171 user    0m0.194s
172 sys     0m0.141s
173
174 real    0m0.322s
175 user    0m0.199s
176 sys     0m0.123s
177
178 real    0m0.341s
179 user    0m0.192s
180 sys     0m0.149s
181
182 real    0m0.334s
183 user    0m0.185s
184 sys     0m0.149s
185
186 real    0m0.345s
187 user    0m0.177s
188 sys     0m0.168s
189
190 real    0m0.310s
191 user    0m0.209s
192 sys     0m0.100s
193
194 real    0m0.313s
195 user    0m0.177s
196 sys     0m0.136s
197
198 real    0m0.315s
199 user    0m0.179s
200 sys     0m0.135s
```

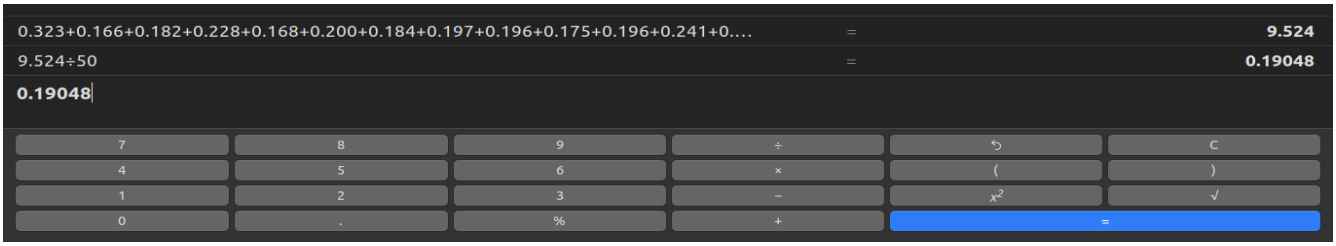
```
142 real    0m0.441s
143 user    0m0.226s
144 sys     0m0.214s
145
146 real    0m0.428s
147 user    0m0.250s
148 sys     0m0.178s
149
150 real    0m0.423s
151 user    0m0.250s
152 sys     0m0.173s
153
154 real    0m0.421s
155 user    0m0.248s
156 sys     0m0.172s
157
158 real    0m0.422s
159 user    0m0.281s
160 sys     0m0.140s
161
162 real    0m0.462s
163 user    0m0.265s
164 sys     0m0.197s
165
166 real    0m0.465s
167 user    0m0.313s
168 sys     0m0.152s
169
170 real    0m0.430s
171 user    0m0.259s
172 sys     0m0.171s
173
174 real    0m0.417s
175 user    0m0.201s
176 sys     0m0.216s
177
178 real    0m0.467s
179 user    0m0.224s
180 sys     0m0.244s
181
182 real    0m0.425s
183 user    0m0.264s
184 sys     0m0.161s
185
186 real    0m0.425s
187 user    0m0.266s
188 sys     0m0.159s
189
190 real    0m0.424s
191 user    0m0.218s
192 sys     0m0.206s
193
194 real    0m0.416s
195 user    0m0.232s
196 sys     0m0.184s
197
198 real    0m0.414s
199 user    0m0.271s
200 sys     0m0.143s
```

Average of the user time taken across the 50 experiments.

Avg → hello.txt



Avg → hello2.txt



```
Number of experiments run:                                N
Average ‘user time’ for hello (int-based calls):          I
Average ‘user time’ for hello2 (syscall-based calls): S

Percentage speedup: (I-S)*100/I
```

N = 50
I = 0.24278

S = 0.19048

0.24278−0.19048	=	**0.0523**
0.0523×100	=	**5.23**
5.23÷0.24278	=	**21.54213…**

percentage = 21.542136914