Domantas Jonas Sakalys
2270326s
SP Exercise 2

Program works, it is in cpp and number of threads is static (1, 2, 3, 4, 6, 8).

```
jonas@Jonas: ~/Desktop/Submission/test


jonas@Jonas:~/Desktop/Submission/test$ make
clang++ -Wall -Werror -std=c++14 -o dependencyDiscoverer dependencyDiscoverer.cpp -lpthread -static-libstdc++
jonas@Jonas:~/Desktop/Submission/test$ time ./dependencyDiscoverer *.y *.l *.c > temp

real    0m0.018s
user    0m0.022s
sys     0m0.030s
jonas@Jonas:~/Desktop/Submission/test$ diff temp output
jonas@Jonas:~/Desktop/Submission/test$ make
clang++ -Wall -Werror -std=c++14 -o dependencyDiscoverer dependencyDiscoverer.cpp -lpthread -static-libstdc++
jonas@Jonas:~/Desktop/Submission/test$ time ./dependencyDiscoverer *.y *.l *.c > temp

real    0m0.021s
user    0m0.021s
sys     0m0.000s
jonas@Jonas:~/Desktop/Submission/test$ diff temp output
jonas@Jonas:~/Desktop/Submission/test$
```

First run was with 8 cores, second with 1.

Lab machine run times:

```
Wed 13:01
Terminal
File  Edit  View  Search  Terminal  Help
bash-4.2$ time ./dependencyDiscoverer *.y *.l *.c > temp

real    0m0.139s
user    0m0.027s
sys     0m0.046s
bash-4.2$ time ./dependencyDiscoverer2 *.y *.l *.c > temp

real    0m0.079s
user    0m0.024s
sys     0m0.054s
bash-4.2$ time ./dependencyDiscoverer3 *.y *.l *.c > temp

real    0m0.061s
user    0m0.023s
sys     0m0.061s
bash-4.2$ time ./dependencyDiscoverer4 *.y *.l *.c > temp

real    0m0.051s
user    0m0.022s
sys     0m0.063s
bash-4.2$ time ./dependencyDiscoverer6 *.y *.l *.c > temp

real    0m0.022s
user    0m0.009s
sys     0m0.013s
bash-4.2$ time ./dependencyDiscoverer8 *.y *.l *.c > temp

real    0m0.026s
user    0m0.016s
sys     0m0.029s
bash-4.2$ ls
dependencyDiscoverer   i_07.h  i_22.h  i_37.h  i_52.h    s_04.c  s_19.c  s_34.c  s_50.c  s_65.c  s_80.c
dependencyDiscoverer2  i_08.h  i_23.h  i_38.h  i_53.h    s_05.c  s_20.c  s_35.c  s_51.c  s_66.c  s_81.c
dependencyDiscoverer3  i_09.h  i_24.h  i_39.h  i_54.h    s_06.c  s_21.c  s_36.c  s_52.c  s_67.c  s_82.c
dependencyDiscoverer4  i_10.h  i_25.h  i_40.h  i_55.h    s_07.c  s_22.c  s_38.c  s_53.c  s_68.c  s_83.c
dependencyDiscoverer6  i_11.h  i_26.h  i_41.h  i_56.h    s_08.c  s_23.c  s_39.c  s_54.c  s_69.c  s_84.c
dependencyDiscoverer8  i_12.h  i_27.h  i_42.h  i_57.h    s_09.c  s_24.c  s_40.c  s_55.c  s_70.c  s_85.c
diff                   i_13.h  i_28.h  i_43.h  i_58.h    s_10.c  s_25.c  s_41.c  s_56.c  s_71.c  s_86.c
g_01.y                 i_14.h  i_29.h  i_44.h  i_59.h    s_11.c  s_26.c  s_42.c  s_57.c  s_72.c  s_87.c
g_02.y                 i_15.h  i_30.h  i_45.h  i_60.h    s_12.c  s_27.c  s_43.c  s_58.c  s_73.c  temp
i_01.h                 i_16.h  i_31.h  i_46.h  l_01.l    s_13.c  s_28.c  s_44.c  s_59.c  s_74.c
i_02.h                 i_17.h  i_32.h  i_47.h  Makefile  s_14.c  s_29.c  s_45.c  s_60.c  s_75.c
i_03.h                 i_18.h  i_33.h  i_48.h  output    s_15.c  s_30.c  s_46.c  s_61.c  s_76.c
i_04.h                 i_19.h  i_34.h  i_49.h  s_01.c    s_16.c  s_31.c  s_47.c  s_62.c  s_77.c
i_05.h                 i_20.h  i_35.h  i_50.h  s_02.c    s_17.c  s_32.c  s_48.c  s_63.c  s_78.c
i_06.h                 i_21.h  i_36.h  i_51.h  s_03.c    s_18.c  s_33.c  s_49.c  s_64.c  s_79.c
bash-4.2$ pwd
/users/level3/2270326s/Downloads/Submission/test
bash-4.2$
```

CRAWLER_THREADS	1	2	3	4	6	8
	Elapsed Time	Elapsed Time	Elapsed Time	Elapsed Time	Elapsed Time	Elapsed Time
Execution 1	0.136	0.098	0.062	0.054	0.046	0.028
Execution 1	0.159	0.073	0.062	0.051	0.044	0.026
Execution 1	0.130	0.074	0.062	0.052	0.049	0.026
0.000	0.142	0.082	0.062	0.052	0.046	0.027

a) For this input data additional threads were not beneficial on my laptop, but on the lab computer they did run a lot quicker. With more data, threads would be very beneficial as they would cut execution time by nearly a magnitude of threads in disposal.
b) With the lab machine barely loaded the elapsed time are quite constant but variations do appear.