

Singers - Threads

This assignment gives the programmer experience with using posix threads (pthreads) to have pthread functions display song lyric lines and update a sung line counter for each lyric line displayed. The pthread functions will have multiple pthreads executing in the pthread function concurrently in a thread safe manner. A mutex will be used to provide critical code areas that allow one thread at a time to execute in critical code areas.

This assignment will specify what program must do to setup the multiple pthreads and run the pthreads.

The program reads in the provided song lyric file into a vector. The program will create pthread function starts and wait for all created threads to complete. The threads will read the shared vector for lyric lines and display each line. A mutex will be used for all cout operations and for updating the total lines sung counter. Unfortunately, C++ 11 does not support multiple cout operations across threads in a thread safe manner. Therefore, the application code must treat the couts as a critical code section, using a mutex to make all the cout operations thread safe.

Each thread will display up to 10 lyric lines and then go to sleep for 1 second. The thread may not make doing all 10 lines, because the Unix operating system is a pre-emptive operating system. This means that Unix may switch out the thread before the 10 lines complete. If the thread is pre-empted (switched out), when Unix runs the thread again, the thread will continue at the location where it left off.

The sleep for a second after the 10 lines are completed, is designed for each thread to give up its time slice, instead of waiting for Unix to pre-empt its execution. It is done by this application, to better demonstrate the threads execution asynchronous behavior.

General Program Requirements

Use the standard pthread operations in the include file pthread.h.

Use C++ (g++) features (iostream, string... etc.).

You must use try-catch LineInfo.h throws for all socket API command.

Build using g++ -std=c++11.

The name of the source programs and associated execution file are:

singers.cpp
singers

Songs File

The PopLife.txt file which is an argument to the program is located at:

~smd013000/courses/3377/assigns/07/PopLife.txt

Vector<string>

The lyric lines words from the PopLife.txt file must be read into a vector.

Program Command Line

To run the program:

./singers PopLife.txt 4 //PopLife.txt is the song lyrics file and 4 is the number of singers.

Output (Display)

The end of this document has an output display to be used as a guide to correct output of a successful run.

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Activities File

After done designing and testing, capture the run results in an activities text file named activity.txt.

This activity.txt file must contain a successful run of the program as follows:

```
./singers PopLife.txt 4
```

Use the copy and paste technique to a local editor text file for creating the singers.txt file.

Do not use script or terminal session to create the sockguess.txt file.

See the sample run below.

Submittal

Put in a zip folder that you name:

```
LineInfo.h  
singers.cpp  
PopLife.txt  
activity.txt
```

Submit the .zip folder to blackboard.

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```
{cslinux1:~/courses/3377/assigns/07} g++ -std=c++11 singers.cpp -o singers -pthread  
{cslinux1:~/courses/3377/assigns/07} ./singers PopLife.txt 4
```

Song Lyrics File Name is : PopLife.txt

Number of lyric lines is : 59

create thread 1

create thread 2

create thread 3

start thread 1

```
1 : 0 > What's the matter with your life  
1 : 1 > Is the poverty bringing u down?  
1 : 2 > Is the mailman jerking u round?  
1 : 3 > Did he put your million dollar check
```

start thread 2

```
2 : 0 > What's the matter with your life  
2 : 1 > Is the poverty bringing u down?  
  
1 : 4 > In someone elses box?  
1 : 5 > Tell me, whats the matter with your world  
1 : 6 > Was it a boy when u wanted a girl? (boy when u wanted a girl)  
1 : 7 > Dont u know straight hair aint got no curl (no curl)  
1 : 8 > Life it aint real funky  
1 : 9 > Unless its got that pop
```

start thread 3

```
3 : 0 > What's the matter with your life  
3 : 1 > Is the poverty bringing u down?  
3 : 2 > Is the mailman jerking u round?  
3 : 3 > Did he put your million dollar check  
3 : 4 > In someone elses box?  
3 : 5 > Tell me, whats the matter with your world  
3 : 6 > Was it a boy when u wanted a girl? (boy when u wanted a girl)  
3 : 7 > Dont u know straight hair aint got no curl (no curl)  
3 : 8 > Life it aint real funky  
3 : 9 > Unless its got that pop
```

create thread 4

```
2 : 2 > Is the mailman jerking u round?  
2 : 3 > Did he put your million dollar check  
2 : 4 > In someone elses box?  
2 : 5 > Tell me, whats the matter with your world  
2 : 6 > Was it a boy when u wanted a girl? (boy when u wanted a girl)  
2 : 7 > Dont u know straight hair aint got no curl (no curl)  
2 : 8 > Life it aint real funky  
2 : 9 > Unless its got that pop
```

start thread 4

```
4 : 0 > What's the matter with your life  
4 : 1 > Is the poverty bringing u down?
```

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4 : 2 > Is the mailman jerking u round?
4 : 3 > Did he put your million dollar check
4 : 4 > In someone elses box?
4 : 5 > Tell me, whats the matter with your world
4 : 6 > Was it a boy when u wanted a girl? (boy when u wanted a girl)
4 : 7 > Dont u know straight hair aint got no curl (no curl)
4 : 8 > Life it aint real funky
4 : 9 > Unless its got that pop

1 : 10 > Dig it
1 : 11 > Pop life
1 : 12 > Everybody needs a thrill
1 : 13 > Pop life
1 : 14 > We all got a space 2 fill
1 : 15 > Pop life
1 : 16 > Everybody cant be on top
1 : 17 > But life it aint real funky
1 : 18 > Unless its got that pop
1 : 19 > Dig it

3 : 10 > Dig it
3 : 11 > Pop life
3 : 12 > Everybody needs a thrill
3 : 13 > Pop life
3 : 14 > We all got a space 2 fill
3 : 15 > Pop life
3 : 16 > Everybody cant be on top
3 : 17 > But life it aint real funky
3 : 18 > Unless its got that pop
3 : 19 > Dig it

2 : 10 > Dig it
2 : 11 > Pop life
2 : 12 > Everybody needs a thrill
2 : 13 > Pop life
2 : 14 > We all got a space 2 fill
2 : 15 > Pop life
2 : 16 > Everybody cant be on top
2 : 17 > But life it aint real funky
2 : 18 > Unless its got that pop
2 : 19 > Dig it

4 : 10 > Dig it
4 : 11 > Pop life
4 : 12 > Everybody needs a thrill
4 : 13 > Pop life
4 : 14 > We all got a space 2 fill
4 : 15 > Pop life
4 : 16 > Everybody cant be on top
4 : 17 > But life it aint real funky
4 : 18 > Unless its got that pop
4 : 19 > Dig it

1 : 20 > Tell me, whats that underneath your hair?
1 : 21 > Is there anybody living there? (anybody living there)
1 : 22 > U cant get over, if u say u just don't care (don't care)
1 : 23 > Show me a boy who stays in school
1 : 24 > And Ill show u a boy aware!
1 : 25 > Dig it
1 : 26 > Pop life

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1 : 27 > Everybody needs a thrill
1 : 28 > Pop life
1 : 29 > We all got a space 2 fill

3 : 20 > Tell me, whats that underneath your hair?
3 : 21 > Is there anybody living there? (anybody living there)
3 : 22 > U cant get over, if u say u just don't care (don't care)
3 : 23 > Show me a boy who stays in school
3 : 24 > And Ill show u a boy aware!
3 : 25 > Dig it
3 : 26 > Pop life
3 : 27 > Everybody needs a thrill
3 : 28 > Pop life
3 : 29 > We all got a space 2 fill

2 : 20 > Tell me, whats that underneath your hair?
2 : 21 > Is there anybody living there? (anybody living there)
2 : 22 > U cant get over, if u say u just don't care (don't care)
2 : 23 > Show me a boy who stays in school
2 : 24 > And Ill show u a boy aware!
2 : 25 > Dig it
2 : 26 > Pop life
2 : 27 > Everybody needs a thrill
2 : 28 > Pop life
2 : 29 > We all got a space 2 fill

4 : 20 > Tell me, whats that underneath your hair?
4 : 21 > Is there anybody living there? (anybody living there)
4 : 22 > U cant get over, if u say u just don't care (don't care)
4 : 23 > Show me a boy who stays in school
4 : 24 > And Ill show u a boy aware!
4 : 25 > Dig it
4 : 26 > Pop life
4 : 27 > Everybody needs a thrill
4 : 28 > Pop life
4 : 29 > We all got a space 2 fill

1 : 30 > Pop life
1 : 31 > Everybody cant be on top
1 : 32 > But life it aint real funky
1 : 33 > Unless its got that pop
1 : 34 > Dig it
1 : 35 > What u putting in your nose?
1 : 36 > Is that where all your money goes (is that where your money goes)
1 : 37 > The river of addiction flows
1 : 38 > U think its hot, but there wont be no water
1 : 39 > When the fire blows

3 : 30 > Pop life
3 : 31 > Everybody cant be on top
3 : 32 > But life it aint real funky
3 : 33 > Unless its got that pop
3 : 34 > Dig it
3 : 35 > What u putting in your nose?
3 : 36 > Is that where all your money goes (is that where your money goes)
3 : 37 > The river of addiction flows
3 : 38 > U think its hot, but there wont be no water
3 : 39 > When the fire blows

2 : 30 > Pop life

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2 : 31 > Everybody cant be on top
2 : 32 > But life it aint real funky
2 : 33 > Unless its got that pop
2 : 34 > Dig it
2 : 35 > What u putting in your nose?
2 : 36 > Is that where all your money goes (is that where your money goes)

4 : 30 > Pop life
4 : 31 > Everybody cant be on top
4 : 32 > But life it aint real funky
4 : 33 > Unless its got that pop
4 : 34 > Dig it
4 : 35 > What u putting in your nose?
4 : 36 > Is that where all your money goes (is that where your money goes)
4 : 37 > The river of addiction flows
4 : 38 > U think its hot, but there wont be no water
4 : 39 > When the fire blows

2 : 37 > The river of addiction flows
2 : 38 > U think its hot, but there wont be no water
2 : 39 > When the fire blows

1 : 40 > Dig it
1 : 41 > Pop life
1 : 42 > Everybody needs a thrill
1 : 43 > Pop life
1 : 44 > We all got a space 2 fill
1 : 45 > Pop life
1 : 46 > Everybody wants to be on top
1 : 47 > But life it aint real funky
1 : 48 > Unless its got that pop
1 : 49 > Dig it

3 : 40 > Dig it
3 : 41 > Pop life
3 : 42 > Everybody needs a thrill
3 : 43 > Pop life
3 : 44 > We all got a space 2 fill
3 : 45 > Pop life
3 : 46 > Everybody wants to be on top
3 : 47 > But life it aint real funky
3 : 48 > Unless its got that pop
3 : 49 > Dig it

4 : 40 > Dig it

2 : 40 > Dig it
2 : 41 > Pop life

4 : 41 > Pop life
4 : 42 > Everybody needs a thrill
4 : 43 > Pop life
4 : 44 > We all got a space 2 fill
4 : 45 > Pop life
4 : 46 > Everybody wants to be on top
4 : 47 > But life it aint real funky
4 : 48 > Unless its got that pop
4 : 49 > Dig it

2 : 42 > Everybody needs a thrill

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```
2 : 43 > Pop life
2 : 44 > We all got a space 2 fill
2 : 45 > Pop life
2 : 46 > Everybody wants to be on top
2 : 47 > But life it aint real funky
2 : 48 > Unless its got that pop
2 : 49 > Dig it

1 : 50 > Pop life
1 : 51 > Everybody needs a thrill
1 : 52 > Pop life
1 : 53 > We all got a space 2 fill
1 : 54 > Pop life
1 : 55 > Everybody cant be on top
1 : 56 > But life it aint real funky
1 : 57 > Unless its got that pop
1 : 58 > Dig it

3 : 50 > Pop life
3 : 51 > Everybody needs a thrill
3 : 52 > Pop life
3 : 53 > We all got a space 2 fill
3 : 54 > Pop life
3 : 55 > Everybody cant be on top
3 : 56 > But life it aint real funky
3 : 57 > Unless its got that pop
3 : 58 > Dig it

4 : 50 > Pop life
4 : 51 > Everybody needs a thrill
4 : 52 > Pop life
4 : 53 > We all got a space 2 fill
4 : 54 > Pop life
4 : 55 > Everybody cant be on top
4 : 56 > But life it aint real funky
4 : 57 > Unless its got that pop
4 : 58 > Dig it

2 : 50 > Pop life
2 : 51 > Everybody needs a thrill
2 : 52 > Pop life
2 : 53 > We all got a space 2 fill
2 : 54 > Pop life
2 : 55 > Everybody cant be on top
2 : 56 > But life it aint real funky
2 : 57 > Unless its got that pop
2 : 58 > Dig it
done thread 1
done thread 3
done thread 4
done thread 2
```

Program done
Total Line count sung : 236