# ASG 04

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**Subject:** OS

**Reader writer problem using mutex**

#include <stdio.h>

#include <pthread.h>

pthread\_mutex\_t db\_mutex;

int readerCount = 0;

void \*reader(void \*arg)

{

pthread\_mutex\_lock(&db\_mutex);

readerCount++;

FILE \*file = fopen("shared\_resource.txt", "r");

int shared\_resource;

fscanf(file, "%d", &shared\_resource);

fclose(file);

printf("Reader %ld entered db\n", (long)arg);

printf("Reader %ld is reading shared resource: %d\n", (long)arg, shared\_resource);

readerCount--;

pthread\_mutex\_unlock(&db\_mutex);

pthread\_exit(NULL);

}

void \*writer(void \*arg)

{

pthread\_mutex\_lock(&db\_mutex);

printf("Writer %ld entered db\n", (long)arg);

// Open the file in append mode

FILE \*file = fopen("shared\_resource.txt", "a");

if (file != NULL) {

fprintf(file, "Writer %ld wrote.\n", (long)arg);

fclose(file); // Close the file after writing

} else {

printf("Error opening the file.\n");

}

printf("Writer %ld exited from db\n", (long)arg);

pthread\_mutex\_unlock(&db\_mutex);

pthread\_exit(NULL);

}

int main()

{

int num\_readers, num\_writers;

printf("Enter the number of readers: ");

scanf("%d", &num\_readers);

printf("Enter the number of writers: ");

scanf("%d", &num\_writers);

pthread\_t readers[num\_readers], writers[num\_writers];

pthread\_mutex\_init(&db\_mutex, NULL);

for (long i = 0; i < num\_readers/2; i++)

{

pthread\_create(&readers[i], NULL, reader, (void \*)i);

}

for (long i = 0; i < num\_writers; i++)

{

pthread\_create(&writers[i], NULL, writer, (void \*)&i);

}

for (long i = 0; i < num\_readers/2; i++)

{

pthread\_join(readers[i], NULL);

}

for (long i = 0; i < num\_writers; i++)

{

pthread\_join(writers[i], NULL);

}

for (long i = num\_readers/2;i<num\_readers; i++)

{

pthread\_create(&readers[i], NULL, reader, (void \*)i);

}

for (long i = num\_readers/2;i<num\_readers; i++)

{

pthread\_join(readers[i], NULL);

}

pthread\_mutex\_destroy(&db\_mutex);

return 0;

}

Output:



