

Multithreads

producer consumer problem ver.2

occur when multiple threads are performing non-atomic read-modify-write concurrently or in parallel

race condition

local thread storage (LTS)

(pthreads) __thread to variable declaration

signal handling

to notify a process that a particular event has occurred=an exception

implicit threading

thread pools

at process startup, create a predefined number of threads in a pool
pros: faster than creating a new thread, separating tasks from mechanism of creating task

OpenMP

Grand Central Dispatch

thread library

2 ways of implementing

library entirely in user space

kernel-level library supported by the OS

pthread

specification, not implementation

windows threads (kernel threads)

java threads (user threads)

motivation

multiple sub-tasks within an app can be implemented by separate threads

process creation is heavy-weight vs thread creation is light-weight

simplify code and increase efficiency, doesn't have to deal with IPC

multicore programming

type of parallelism

data parallelism

task parallelism

distributing threads across cores, each thread performing unique operation

user/kernel thread

user threads

using a threads library without OS support

kernel threads

supported and managed by OS kernel

multi threading model

one2one

one2many

many2many