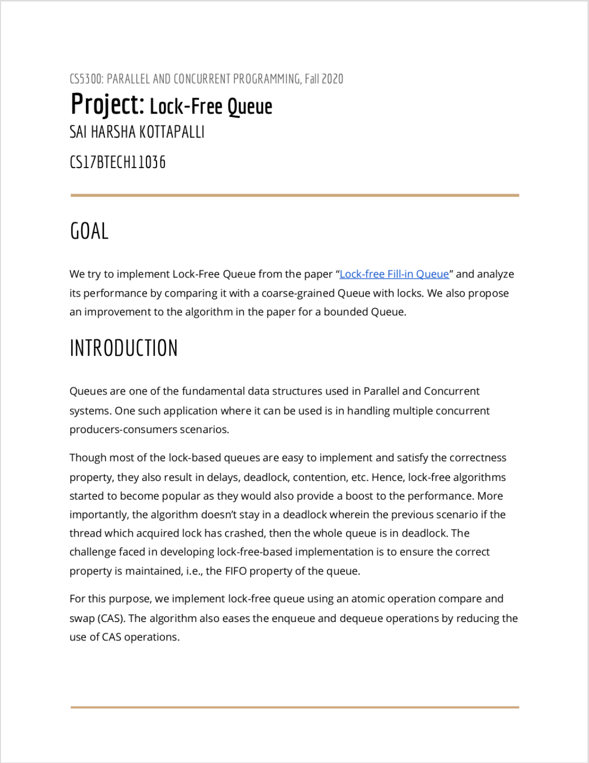
Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	Sai Harsha Kottapalli
Assignment title:	Final Course Project
Submission title:	Fill in Queue
File name:	Project_Report_CS17BTECH11036…
File size:	244.92K
Page count:	14
Word count:	2,299
Character count:	11,202
Submission date:	23-Dec-2020 10:36PM (UTC+0530)
Submission ID:	1480911474



CS5300: PARALLEL AND CONCURRENT PROGRAMMING, Fall 2020

Project: Lock-Free Queue

SAI HARSHA KOTTAPALLI

CS17BTECH11036

GOAL

We try to implement Lock-Free Queue from the paper “Lock-free Fill-in Queue” and analyze its performance by comparing it with a coarse-grained Queue with locks. We also propose an improvement to the algorithm in the paper for a bounded Queue.

INTRODUCTION

Queues are one of the fundamental data structures used in Parallel and Concurrent systems. One such application where it can be used is in handling multiple concurrent producers-consumers scenarios.

Though most of the lock-based queues are easy to implement and satisfy the correctness property, they also result in delays, deadlock, contention, etc. Hence, lock-free algorithms started to become popular as they would also provide a boost to the performance. More importantly, the algorithm doesn’t stay in a deadlock wherein the previous scenario if the thread which acquired lock has crashed, then the whole queue is in deadlock. The challenge faced in developing lock-free-based implementation is to ensure the correct property is maintained, i.e., the FIFO property of the queue.

For this purpose, we implement lock-free queue using an atomic operation compare and swap (CAS). The algorithm also eases the enqueue and dequeue operations by reducing the use of CAS operations.