REPORT ON
PARALLEL GRAPH METHOD AT
IIT Hyderabad

INTRODUCTION:

This report is about the skills attained ,lesson learnt , relatedness topic covered on Topic "Parallel graph Method" under Dr. Sathya Peri for the duration of 1 month from 1st June 2019 to 30th June 2019.The report also represents my experiences and benefits of parallel graph method.

DESCRIPTION:

I carried my internship on topic "Parallel graph Method". Under this topic, I worked initially on serial processing, Parallel computing threads, threading issues, thread synchronization, then ptheads, Producer consumer Problem, Reader writer problem, Graph traversals, parallelism, Page rank algorithm, betweeness centrality.

Firstly the topic is based on parallelism, As parallelism is also referred as parallel computing/processing. Parallel computing is a form of computation in which many calculation are carried out simultaneously, operating on the principle that large problem can often be divided into smaller ones, which are often solved concurrently("in parallel").There are several different forms of parallel computing: bit-level, instruction level, data computing and task parallelism. Parallel computing has become the dominant paradigm in computer architecture, mainly in the form of multi-core architecture. Parallel processing has advantages like it can perform multiple processes simultaneously, cost saving, time saving, Overcoming memory constraints.

Parallelism can be achieved by using threads. A Thread is defined as an independent set of instruction that can be scheduled to run as such by the operating system. The ways to define a Thread is by extending Thread class and by implementing Runnable Interface. Then about Pthreads: pthread is also defined as POSIX thread .It is an execution model that exists independently from a language as well as a parallel execution model. It allows a program to control multiple different flows of work that overlap in time. Each flow of work is referred to as is achieved by making calls to posix threads API.

Then, PageRank is an algorithm used by the Google web search engine to rank websites in their search Engine results. PageRank is a way of measuring the importance of websites pages.

Betweeness centrality quantifies the number of times a node acts as a bridge along the shortest path between two other nodes.

KNOWLEDGE:
During this period of internship I acquired a lot of knowledge and skills. I got brief understanding in the implementation part of parallelism using threads as well as pthreads. I also learnt about many algorithms encompasses graph, graph traversal, page rank algorithm, Betweeness centrality etc. using some languages like C, java.

EXPERIENCE:
I really enjoyed the experience of working at IIT Hyderabad including the comfortable working atmosphere, the technical guidance provided by my mentor is really good with a friendly relationship. He supported and guided me in each and every step during the internship. I also got an opportunity to meet a Ph.D. student to have discussion about my topic.

CONCLUSION:
On the whole, this internship was an amazing experience. We have gained new knowledge, skills and met many new people. We achieved

several of our learning goals. This internship programme was not one sided, but it is a way of sharing knowledge, ideas and opinions. The internship was also good in finding out what our strengths and weaknesses are. This helped us to define what skills and knowledge we have to improve in future. At last this internship has given us new insight and motivation to pursue a career in core computer science department.

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