

CALCURING

THEORY OF COMPUTER SCIENCE PROJECT
BSCS-501

Department of Computer Science
UNIVERISTY OF KARACHI

DECLARATION

We:

- 1) Azeem Ullah Baig
- 2) Syed Mohammad Bilal
- 3) Ahmed Kasmani

students of BSCS (Semester-V) Department of Computer Science, University Of Karachi hereby declare that we are going to do project on '**CALCURING**' in academic year of 2017.

This information submitted is true original best of our knowledge.

Azeem Ullah Baig

EP-1449022

Syed Mohammad Bilal

EP-1449069

Ahmed Kasmani

EP-1449060

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We would like to acknowledge our debt to each & every person associated in this Project Development. The Project Development will require huge Commitment from every individual involved in it.

We are also indebted to **Miss Shaista** who has guided us throughout theoretical background of Theory of Computer Science (Automata). And notable thanks to our Lab teacher **Ms. Faiza** who taught us technical details on course.

From the guidance of both we will be able to complete the Project Development. We are Thankful for the patience with which they stood by us during course.

INTRODUCTION

Overview:

The CALCURING Project is the basic calculator implemented on Turing Machine. The calculator will perform Mathematical operations. It will also have friendly Graphical User Interface (GUI) for better user experience (UX).

Objective:

- The main objective of the project is to design and develop a user friendly system.
- Easy to use and efficient calculating system.
- To perform optimized operations.
- To get accurate output.
- With GUI that will help user for better experience.
- To check user has input the correct numeric.

Technical Background:

- Java (SE 8) – For All logical implementation.
- JavaFX – For Desktop Client (GUI)

BACKGROUND

Turing Machine:

The Turing Machine is septuplets. The Turing machine mathematically models a mechanically operating machine on a tape. It has the tape for taking input from the cell. The tape by default has the blank symbol (#) in all the cells. The head for moving in the right or left direction to perform read/write operation. A state register that has the initial value, as a start state for storing the Turing Machine's state. Then a finite table of instruction.

Basic Calculator:

The basic calculation frequently refers the basic arithmetic operations. Those are:

- Addition [represented by the operator +]
- Subtraction [represented by the operator -]
- Multiplication [represented by the operator \times or *]
- Division [represented by the operator \div or /]

Related Works:

Turing A M (1936) invented the automatic machine that processes input symbols based on the rules. Many scientists invented the similar computational model. Post E L (1936) invented the similar machine model. Lin S & Rado T (1965) discussed the Turing Machine problems. Boolos G S & Jeffrey R C (1974) and Davis M (1982) written a book on the topic the computability.

Hopcraft J E et. al (2001) explained about the subroutine usage in the Turing Machine. This subroutine technique was used to construct the Turing Machine for multiplication and division. Martin J C (2010) explained the Turing Machine to support the implementation of palindrome and the reversing the string. Ezhilarasu P & Sowmya R (2015) constructed the Turing Machine to check the equivalence of the input string for the three input characters.

CONCLUSION

The Turing Machine bi-directional movement both in forward and backward direction supports the implementation of the basic calculator. This capability can be used to build the Turing Machine for finding modulus value for the given input.