

॥ लाभले आम्हास भाग्य 'कोड' तो मराठी ॥

आता प्रोग्रेमिंग करा, मराठीत ! **दीप**



**DEEP - DEvanagari Enabled Programming**

# **DEEP – DEvanagari Enabled Programming**

## **A way to program in Marathi!**

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# DEEP : Project Problem Statement

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**"To implement DEEP - DEvanagari Enabled Programming, a Non-English based programming system which will enable learning and writing computer programs in Marathi."**

# DEEP : Introduction

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DEEP : A way to program in Marathi

- Mother tongue is essential for learning as a part of intellectual ability. It helps child in his or her moral, mental and emotional development. [3]
- As of now, programming in India is only limited to people who can understand and code in English which creates a barrier of language for people from non-English background. [1]
- Also, It will be better to introduce programming in mother tongue at elementary school level rather than an unknown language. [3]
- Conservation of Language
- Hence DEEP : A way to program in Marathi

# DEEP : Literature Survey

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## [1] ChaScript: Breaking Language Barrier using a Bengali Programming System

*8th International Conference on Electrical and Computer Engineering 20-22 December, 2014, Dhaka, Bangladesh.*

- ChaScript is non English based educational programming for the people who are not adequate in English. It helps Bengali people to write programs in Bengali.
- Social Cognitive Theory states that, learning from other people by means of observing them is an effective way of gaining knowledge and altering behaviour.
- In order to build the programming system, the grammar of the scripting language ECMAScript was used and the grammar was parsed using a JavaScript parser generator, Jison.
- It would be useful for Bengali students to use as a platform to learn computer programming.

# DEEP : Literature Survey

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## [2] Dolittle — Experiences in Teaching Programming at K12 Schools

*Proceedings of the Second International Conference  
on Creating, Connecting and Collaborating through Computing (C5'04)*

- Dolittle is Japanese based educational programming language. It uses concept of interpreter, i.e. single line programs, statements.
- No functions support is provided. It is developed in Java, so that it can be run on variety of computer environments, most often used in schools.
- Dolittle has been extended to support various programming paradigms such as robot control, graphics and distributed programming.

# DEEP : Literature Survey

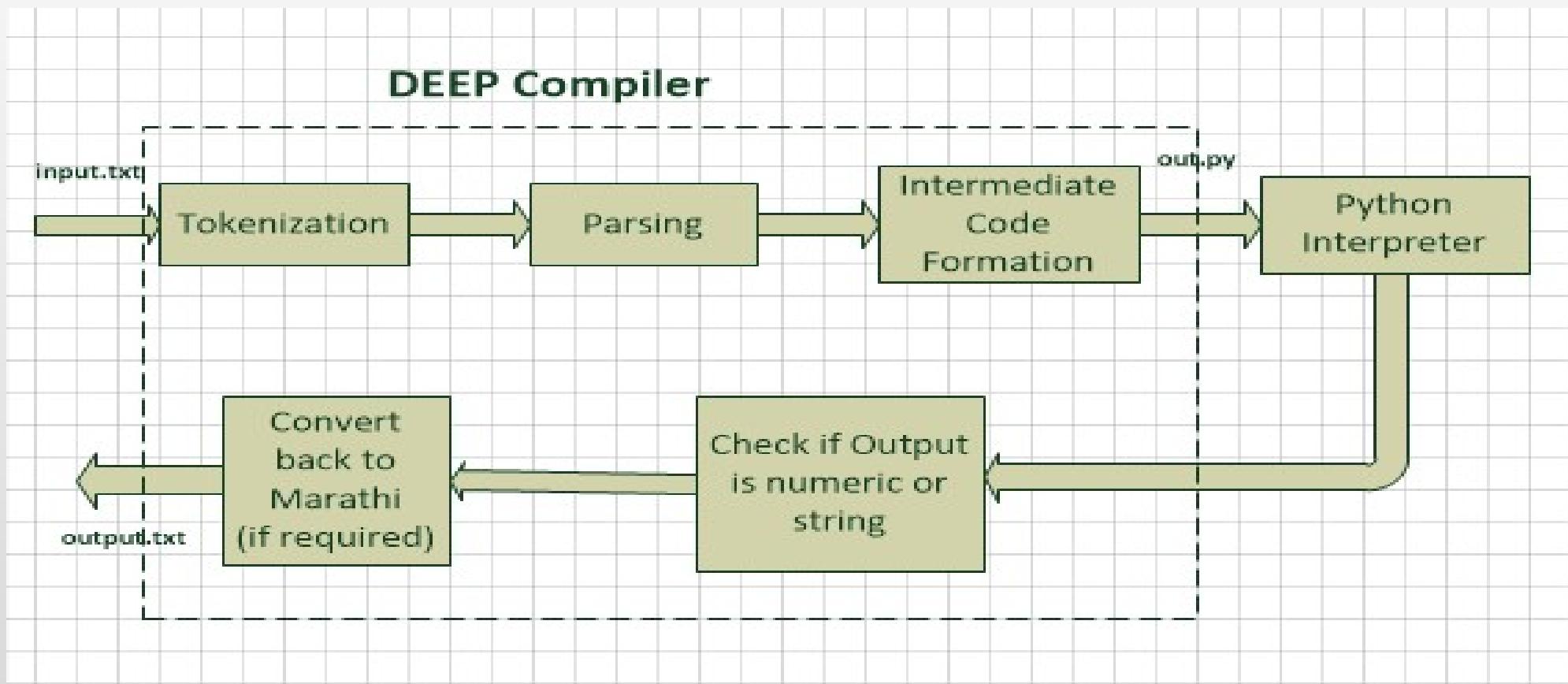
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## [3] Noormohamadi : Mother tongue, a necessary step to intellectual development.

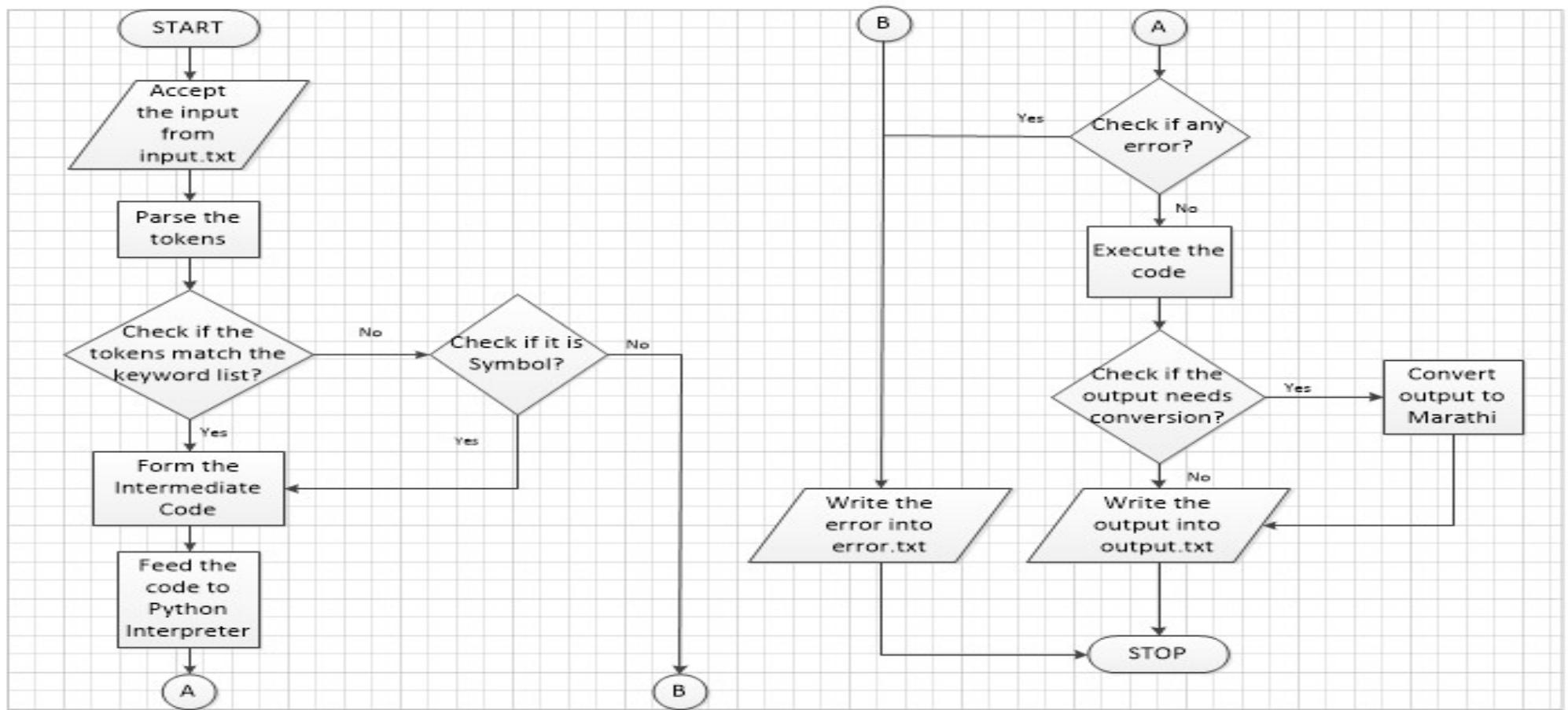
*2008 Journal of Pan-Pacific Association of Applied Linguistics, 12(2), 25-36.*

- Language is primary tool from childhood to adult stage, in entire life. It helps in social interaction, understanding, reasoning etc.
- Mother tongue is essential for learning as a part of intellectual ability. It helps a child in his or her moral, mental and emotional development.
- Mother tongue has central role in education that demands cognitive development. Studies show that children who come to school with solid foundation in their mother tongue show stronger intellectual abilities.

# DEEP : Block Diagram



# DEEP : Flowchart



# DEEP : Methodology

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- Not a new programming language but a software
- Working on top of Python 2.7
- Conversion of Marathi code to equivalent Python code
- Convert back output if required
- Start python compiler at backend

# DEEP : Hardware and Software requirements

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- DEEP in the form of compiler is a platform for development in Marathi.
- OS- Any OS(Windows, Ubuntu) which supports Python 2.7.
- Language- Python 2.7
- Pyparsing module.
- PyQt5 for GUI and its dependencies.
- Hardware Specifications- A computer system with DEEP and needed Python libraries installed
- Virtual Keyboard or ibus for Devanagari typing.

# DEEP : Scope of DEEP

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- Datatypes: int, char, str
- Logical operators: AND, OR, NOT
- Loops: For, while
- Conditional Statements: if, elif, else
- Functions: raw\_input, print
- Braces: Round
- Errors: (Optional Extension) Syntax error, Undefined error

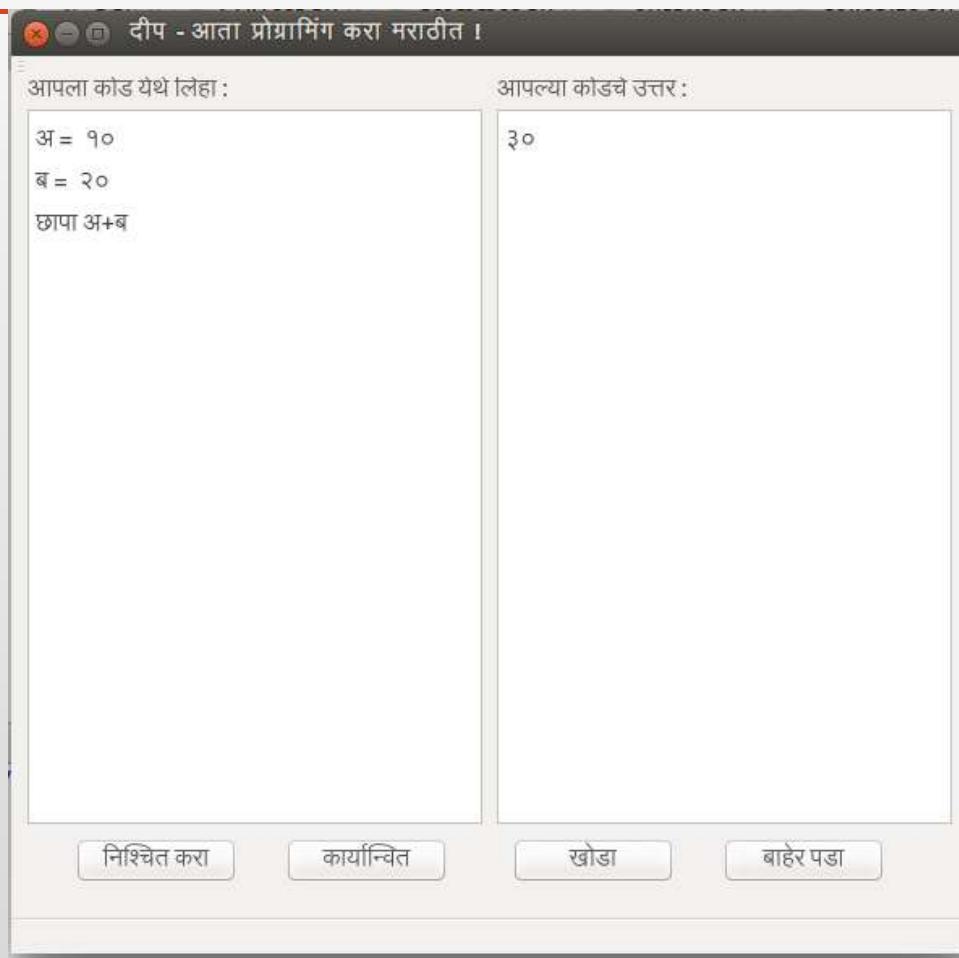
# DEEP : Working Model

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## GUI:

- DEEP has a simple GUI which is understandable to every user who knows Marathi language.
- It provides options for saving the code and executing the same.
- User simply needs to write the Marathi code and choose the appropriate option to get the output on output window.

# DEEP : Working Model



# DEEP : Applications

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- DEEP can help students (who don't know much about English) to implement logic and perform coding at elementary Levels.
- Even people, who are not comfortable with English, DEEP can help them overcome this barrier.

# DEEP : Limitations

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- No support from Global Developer's Community for development of code in Marathi Python.
- Only allows to use Marathi as coding language and not to develop logic.
- Marathi Keyboard is a mandatory requirement.

# DEEP : Ideas to overcome limitations

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- DEEP can be built for entire Python language, to give real feeling of coding in Marathi.
- Use of Virtual Keyboard is currently available.
- This project can be extended to other Indic languages.
- Extensive Error Handling could also be a part of DEEP.

# DEEP : References

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- [1] Arman Kamal, Md. Nuruddin Monsur, Syed Tanveer Jishan and Nova Ahmed "ChaScript: Breaking Language Barrier using a Bengali Programming System" 8th International Conference on Electrical and Computer Engineering 20-22 December, 2014, Dhaka, Bangladesh
- [2] Susumu Kanemune, Takako Nakatani, Rie Mitarai, Shingo Fukui, Yasushi Kuno "Dolittle — Experiences in Teaching Programming at K12 Schools" Proceedings of the Second International Conference on Creating, Connecting and Collaborating through Computing (C5'04) 0-7695-2166-5/04 \$20.00 © 2004 IEEE
- [3] Rezvan Noormohamadi "Mother Tongue, a Necessary Step to Intellectual Development" Pan-Pacific Association of Applied Linguistics 12(2)
- [4] Ruslan's Blog, Let's Build A Simple Interpreter. Part 11. <https://ruslanspivak.com/>
- [5] UN News Centre, 21 Feb 2015," On Mother Language Day, UN spotlights role of native tongue in education "

Thank You !

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Thank you !