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Pytham: Python Pre-Processor Utility

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Introduction

We all know that programmers are the one of the main factors for the growth of Computer Technology. This project was started by keeping an idea in mind that the syntax to be used in a Tamil programming language is to be an easy one to follow as well as to be simple to understand. For this conceptual idea to be practicalized, "Pytham" has been developed.

The Main goal of "Pytham" is to make Tamil computer users to understand the concepts of programming by allowing them to write simple programs using Tamil syntax.

The achieved goals in the development of Pytham are forming an easy to follow syntax, implementation of Interactive mode, easily extendable structure, displaying common Exception/ Error Messages in Tamil and emulation of OOP. Truly speaking, Pytham is not a Compiler or Interpreter. Pytham do 'on the fly' conversion of Tamil Source to English and English Output to Tamil. This makes this simple utility act as a programming language.

Features of "Pytham"

Easy to follow syntax

Example :

வயது = எண்உள்ளீடு("உங்கள் வயதைக் கொடுக்கவும்")

மாறி வயது $>= 18$ எனில்

திரையிடு "நீங்கள் ஓட்டு போடலாம்."

இல்லை எனில்

திரையிடு "'நீங்கள் ஓட்டு போட இயலாது.'

Displays Tamil Exception/Error Messages

Common Exception/Error messages like "கோப்பு காணப்படவில்லை", "கட்டளை வரியமைப்புப் பிழை", etc are displayed by Pytham at the appropriate time in Tamil.

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Write and Run in Interactive Mode

In Interactive Mode, 'code snippets' which are entered are executed immediately at the next line. This makes learning process quick and easy.

Platform Independent

Pytham can be used in Linux (Mandrake 9.0) using Tamil console (முனையம்). In Windows there is no support for changing of DOS console font. But we can use GUI TELNET program as a DOS emulator which allows us to changing of fonts or we can use editors such as 'SciTE'. But these editors don't provide full support (ex. Interactive Mode) like consoles.
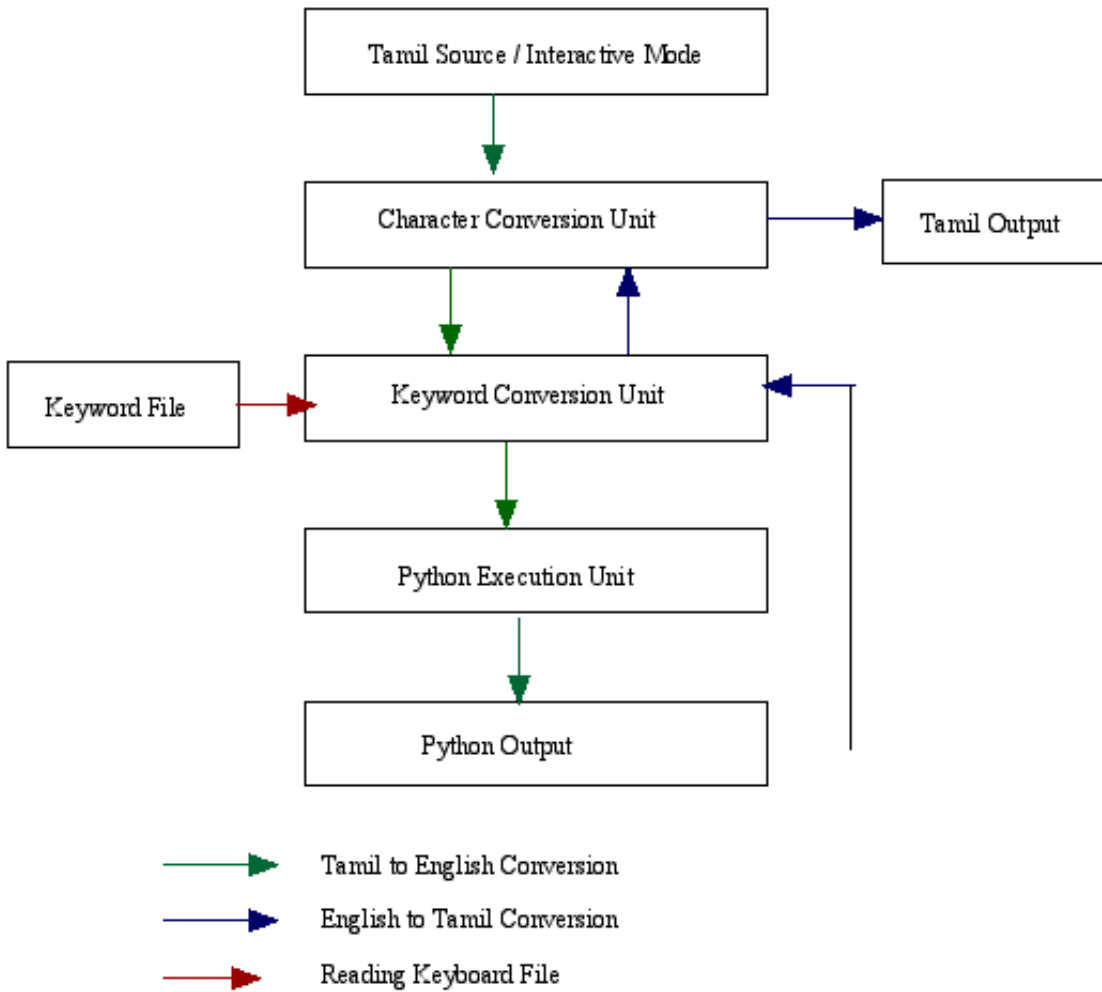
Easily Extendable

Pytham depends on a text file in which Tamil keywords and their equivalent English keywords are stored. Since changing of Tamil keywords in that file do not require any modification in the "Pytham" source code. So Pytham can be easily extended for new keywords by adding it in the Keyword file.

Object Oriented Programming

Object Oriented Programming can be emulated by Pytham.

Architecture

Implementation of Pytham

Introduction to Python

Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms. For all the above reasons and also its syntax exactly matches the Tamil syntax idea in mind. So Python is used as a backend language for Pytham and also for the development of Pytham.

Character Conversion Unit

Python only supports characters which has ASCII value of 128 (7-bit) or less than 128 for its keywords and variable names. But in our 'TSCII Tamil fonts', all Tamil characters have ASCII value of above 128. So, for Python to support Tamil Characters, a 'Character Conversion Unit' has been implemented. This unit translates every Tamil character into its phonetically equal English character set. For example, "த" is translated into 'tha_', "மி" is translated into 'mi_' and so on. Here, the underscore is used to separate Tamil characters which are represented by two

or more characters in English. For example, if we have a word 'THAMIL' and 'AMMA', Pytham cannot understand character 'A' in 'THAMIL' which is for "த" and the first 'A' in 'AMMA' which is for "அ". Hence, Pytham represent these words as 'THA_MI_L_' and 'A_M_MA_'.

Keyword Conversion Unit

'Keyword Conversion Unit' converts Tamil Keywords into Python Keywords. For example "திரையிடு" is translated into 'thi_rai_yi_tu' by 'Character Conversion Unit' and then 'thi_rai_yi_tu' is translated into its equivalent 'print' by 'Keyword Conversion Unit'. Pytham depends on a text file in which Tamil keywords and their equivalent English keywords are stored. The 'Keyword Conversion Unit' reads keywords from this Keyword file. This unit uses 'Regular Expressions' for converting Keywords. 'Regular Expressions' is a commonly used method for string manipulation operations in languages such as Perl, Python etc. Now the Tamil source program is completely converted and ready for execution.

Python Execution Unit

Then 'Python Execution Unit' executes the translated program. The output of 'Python Execution Unit' is again passed into 'Keyword Conversion Unit' to convert English keywords to Tamil Keywords and then passed into 'Character Conversion Unit' to translate phonetically equivalent English characters to Tamil characters and finally Pytham gives us the Tamil Output.

Future of Pytham

As we all know, Python is a free open source project. Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms. So if Python's parser is modified to understand Tamil words then it can be used to develop a true Tamil programming language based on Pytham's simple syntax.

Moreover Python is an embeddable language. So it can even be embedded into Tamil Office Suites to write Macros in Tamil. In fact Pytham has been developed to give a 'Virtual Presentation' of what we will get if we modify the Python parser.

Conclusion

We are working towards to eradicate digital divide by increasing the Tamil softwares and its user base. At present, it would be very appropriate to ask a question as 'Is there any need for a Tamil Programming Language?' To be frank, all of us would have known the kind of great talents that the village students possess. For their talent to be utilized, the right step towards making it would absolutely be an introduction of 'Tamil Programming Language'. That would definitely be revealing the talents of village students.

Acknowledgements

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