**INHA UNIVERSITY TASHKENT**

**DEPARTMENT OF CSE & ICE**

**FALL SEMESTER 2019**

**SOC4140 - THEORY OF PROGRAMMING LANGUAGES**

**TERM PROJECT PROPOSAL**

PROJECT TITLE[ENTER HERE]

**Submitted by**

**Student Names Student ID**

**Ilkhom Rakhimov U1610078**

**Dostonkhon Ozodkhujaev U1610065**

**Ibrat Abidov U1610075**

**Iroda Ulmasboeva U1610080**

**Jamoliddinkhuja Odilkhujaev U1610092**

**Anora Amirova U1610120**

**Group : CIE-16-01 SENIOR**



|  |
| --- |
| **Term Project Guidelines**  **TERM PROJECT INVOLVES THE FOLLOWING MAIN TASKS :**   * **DESIGN OF YOUR OWN PROGRAMMING LANGUAGE**   **You are required to propose a new programming language considering the following factors into account :**   * **Language Evaluation Criteria – Readability, Writability, Simplicity, Orthogonality, Reliability, Cost, Portability leading to ease of coding and Program maintenance** * **Different Applications Domains – Scientific, Business, Artificial Intelligence, Systems Programming, Web, Graphics and other application areas** * **Different Programming Language Paradigms – Imperative, Object Oriented, Declarative, Functional, Logical, Markup and taking the best constructs and features from these language paradigms** * **Above all, considering your experience of developing applications for different domains using different languages during the last three years and feeling the need to have a better programming language with easier constructs and best features which make the user to write programs for different applications (or application of his/her choice) with ease of learning and coding with minimum time and effort** * **Prepare complete specification for all the constructs/features which are going to be incorporated in your proposed Language.** * **DESIGN AND IMPLEMENTATION OF LEXICAL ANALYSER USING FLEX** * **Prepare proper Grammar specification for all the constructs/features of your proposed programming language using BNF/EBNF** * **Implement Lexical Analyser using FLEX** * **DESIGN AND IMPLEMENTATION OF SYNTAX ANALYSER/PARSER USING BISON** * **Implement Parser for your grammar using BISON** * **DESIGN AND IMPLEMENTATION SEMANTIC ANALYSER & INTERMEDIATE CODE GENERATOR WITH MACHINE INDEPENDENT OPTIMIZATION**    + **Design & Implement a Semantic Analyser for the AST output provided by the Parser**   + **Design & Implement an Intermediate Code Generator considering a hypothetical machine**   + **You can write your own Intermediate Code Generator or use any of the tools available to generate the Intermediate Code.**   + **After generating the Intermediate Code, perform machine Independent Optimization on the code generated** * **DESIGN & IMPLEMENTATION OF CODE GENERATOR WITH MACHINE DEPENDENT OPTIMIZATION (IN CASE OF COMPILER IMPLEMENTATION) OR**   **DESIGN & IMPLEMENTATION OF VIRTUAL MACHINE FOR INTERMEDIATE CODE INTERPRETATION (IN CASE OF INTERPRETER IMPLEMENTATION)**   * **Here you have two choices to make – either designing a compiler or a Hybrid Interpreter** * **In the case of Compiler, you need to design and Implement a code generator converting Intermediate code to Intel x86-64 machine Instructions** * **In the case of a Hybrid Interpreter, you need to design and Implement a Virtual Machine to Interpret the Intermediate code and produce the results** * **PROJECT TESTING PHASE – WRITING DIFFERENT PROGRAMS USING YOUR PROPOSED PROGRAMMING LANGUAGE AND EXECUTING THEM USING YOUR OWN COMPILER OR INTERPRETER**   + **This is the Compiler/Interpreter Testing phase where you will write different programs for various applications using your own proposed language and Compile or interpret using your own Compiler/Interpreter**   + **To enter your program, you can use the existing editors or you can design an Integrated Design Environment(IDE) very similar to Python IDLE or Microsoft/Borland IDE or any other IDE of your choice with the following features(YOU WILL GET ADDITIONAL POINTS FOR THIS PART):**     - **Create a new file, open an existing file, file editing features, File save & Exit**     - **In the case of Interpreter, provide an Interpreter shell environment where user can enter the program statement on a line and interpret it to get the results (line by line Interpretation)**     - **In the case of Compiler, provide a menu option Compile & Run so that you can pop up a new window showing compilation your program and the Results**     - **You can also add several other features available on most of the IDEs** * **EACH PROJECT TEAM CAN CONSIST OF 4 TO 8 MEMBERS) WITH A MAXIMUM OF 15 PROJECT TEAMS IN A SECTION.** * **THE PROPOSED TITLE OF THE TERM PROJECT (i.e., NAME OF THE YOUR PROPOSED PROGRAMMING LANGUAGE) ALONG WITH ABSTRACT, BRIEF PROJECT DESCRIPTION, REQUIREMENTS DEFINITION DOCUMENT IN THE FORM OF A PROJECT PROPOSAL (PRELIMINARY DOCUMENT) MUST BE SUBMITTED BY MONDAY 11TH NOVEMBER 2019.** * **PREPARE THE PROJECT PROPOSAL USING THE TEMPLATE PROVIDED AT THE ARCHIVE SECTION OF THE ECLASS PORTAL.** * **ONE HARD COPY OF THE PROJECT PROPOSAL OF EACH TEAM SHOULD BE HANDED IN AT THE OFFICE BY THE TEAM LEADER.** * **EVERY MEMBER OF THE TEAM MUST UPLOAD THE SOFTCOPY OF THE PROJECT PROPOSAL AT THE E-CLASS PORTAL** * **LAST DATE FOR SUBMISSION OF THE PROJECT PROPOSAL IS 11TH NOVEMBER 2019** * **PROJECT PROPOSAL PREPARED USING THE TEMPLATE WILL ONLY BE ACCEPTED** * **LATE SUBMISSIONS ARE NOT ENTERTAINED, ADHERE TO THE DEADLINE STRICTLY** |

**TITLE OF THE PROJECT:**

[Provide the Title here]

Jython

**PROBLEM STATEMENT :**

[State clearly the statement of the problem which you are going to tackle]

These days, everyone is arguing, is it better to have readability or writability. Having a good performance or easiness to write?

Most popular and rapid developing languages such as Python or JavaScript have their own problems. JavaScript and Python are struggling with readability or performance. Therefore, by merging advantages of JavaScript and Python, and adding additional features to it, we’ve achieved new scripting language Jython, with reusable code everywhere and easiness to read and write code.

**ABSTRACT :**

[Provide a gist or executive summary of the project you are going to carry out providing all the details in brief]

Today we want all of our software to go to production, without any defects, fast and informed with all outcomes and status.

Today we are having a huge problem, in improving readability or reliability, performance or readability? For example: Python having a really good readability, but slower performance. JavaScript giving a good performance, but only if the programmer knows how to use it, having a big problem with a beginner, who are making small mistakes, which are then leading to a huge performance problems. Whereas Python is versatile, universal, simpler to use for beginners, even if with JavaScript you can code everything, front and backends.

Therefore, to have the advantages of both programming languages, we are going to create Jython. Having a good readability and performance. Easy to beginners achiev by using well-know programming paradigms.

**PROJECT OVERVIEW :**

* Briefly Describe how the following tasks are going to be performed :
* design of your own programming language

Design is an important part of programming languages. Consequently, object-oriented programming certainly changed how we think about and construct programs. Therefore, several years ago new design appeared that is component oriented programming (COP). Which is all about stitching reusable components together like Lego blocks

Many programming languages provide some mechanism for [abstraction](https://en.wikipedia.org/wiki/Abstraction_(software_engineering)). In object-oriented languages, you can make some members of an object private and you control what is exposed via a public interface. Similarly, a function in most languages exposes just a public interface - you can call it - but it hides the internals of how it works. The idea is that the functioning of function or internals of an object are irrelevant and the caller should not see them.

Component oriented programming – has advantage of reusability. For example: Someone wrote an awesome animation library that’s compatible with all frameworks as libraries as long as it’s written in JavaScript. That’s exactly what the native Web-Components API aims to achieve: a unified way for all libraries to share code.

Imagining the world where any code can be reused by any framework we are going to have all programming language designs such as COP and OOP.

* design and implementation of lexical analyser using flex
* design and implementation of syntax analyser/parser using bison
* design and implementation semantic analyser & intermediate code generator with machine independent optimization
* design & implementation of code generator with machine dependent optimization (in case of compiler implementation) or design & implementation of virtual machine for intermediate code interpretation (in case of interpreter implementation)
* project testing phase – writing different programs using your proposed programming language and executing them using your own compiler or interpreter.

**PROJECT ACTION PLAN :**

**Term Project Tasks Breakup Weekwise**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No** | **Duration** | **Specify Tasks to be carried out** | **Team Members assigned to do various components of this task** |
| 1. | 10th Week  11th Nov. to 17th Nov. 2019 | **Design of our own programming language** |  |
| 2. | 11th Week  18th Nov. to 24th Nov. 2019 | **Design and implementation of lexical analyzer using flex**  **Design and implementation of syntax analyzer/parser using bison** |  |
| 3. | 12th Week  25th Nov. to 1st Dec. 2019 | **Design and implementation semantic analyzer & intermediate code generator with machine independent optimization** |  |
| 4. | 13th Week  2nd Dec.to 8th Dec. 2019 | **Design & implementation of code generator with machine dependent optimization (in case of compiler implementation) or**  **Design & implementation of virtual machine for intermediate code interpretation (in case of interpreter implementation)** |  |
| 5. | 14th Week  8th Dec. to 11th Dec. 2019 | **Project testing phase – writing different programs using your proposed programming language and executing them using your own compiler or interpreter**  **Term project final report preparation** |  |
| 6. | 14th Week  12th Dec. to 14th Dec. 2019 | * **Term Project Final Report Submission** * **Term Project Presentation** | **ALL** |

**PROJECT TEAM :**

**Team Leader :**

**Name Student ID Signature with date**

1. **Ilkhom Rakhimov U1610078 14.11.2019**

**Team Members :**

**Name Student ID Signature with date**

1. **Dostonkhon Ozodkhujaev U1610065 14.11.2019**
2. **Ibrat Abidov U1610075 14.11.2019**
3. **Iroda Ulmasboeva U1610080 14.11.2019**
4. **Jamoliddinkhuja Odilkhujaev U1610092 14.11.2019**
5. **Anora Amirova U1610120 14.11.2019**

**REFERENCES :**

[Provide the list of the books, library resources, websites referenced for understanding various topics required for the design and implementation of your term Project]