Objectives: Group tasks are assigned to facilitate collaborative learning and knowledge transfer among the students, as well as to provide an opportunity to explore programming languages with exquisite details.

Table 1: List of programming languages

Languages	
C	JavaScript
Java	R
Python	C++

Group Task: For all the programming languages given in Table, prepare a comparison report based on one of the topics as stated in Table 2.

Table 2: Selected topics for all the groups

Comparison Topic	
Readability, Writability, Reliability	Data types , Type Checking, Security
Similarities and Dissimilarities	Strength and Weakness
Parameter Passing Methods, Threading	Functional Definition, Subprograms and Nesting
Unique features in each language	Evaluation of control structure and iteration syntax: conciseness and simplicity
Select a few known algorithms (should be discussed with the instructor) and use similar constructs of the aforementioned programming language to do a comparison of their performance	

**The comparison should be supported with proper examples and the related codes.

Please read the papers provided below to gain more insights on the planned projects:

[1] https://journals.plos.org/plosone/article/file?id=10.1371/journal.pone.0088941&type=printable

[2] https://www.cs.ucr.edu/~neamtiu/pubs/icse11bhattacharya.pdf

[3] https://bmcbioinformatics.biomedcentral.com/articles/10.1186/1471-2105-9-82

A few additional tasks …

Task: A brief overview of Python and Julia for beginners

Short examples should be used, and some of the examples should be relevant to what we covered in C-programming assignment.

The tutorial should also cover the basic plotting and visualization techniques available in Python.

Task: Python in Image Processing/Analysis and Data Science: A beginners' guide

Take an Image and do different types of processing that are possible using various libraries available in Python. Again, examples should be very straight forward, as our primary goal is to help developing a basic understanding.

Task: Comparison of different data types and control structures in Java, C, and Python.

Each control structure should be shown with supportive examples. Precisely, similar example should be implemented using Java, Python, C, and the examples should be different than those used in other assignments done in class.

Task: Design a basic form of language generator using any of your preferred programming language

Evaluation

The project may comprise about 8-10% of the total grade. A number of alternative tools will be used to evaluate individual and group performance. Precisely, the evaluations tools are as follows:

Presentation: Each group will give a 10-12 minutes in-class presentation explaining the comparison outcomes.

Report: Each group must submit a report that should follow the below writing guidelines:

- Document size should be between 10 to 12 pages, IEEE/ACM format; small code snippets could be included, but you should not be filling up the spaces using unnecessary codes. Precisely, the document should mostly represent the language features and relevant discussion, and should not be overburdened by code snippets. All the codes and execution outcomes should be submit as a separate folder.
- The document should be referenced according to the IEEE/ACM format.
- Codes in the report should be in plain text font so that one can copy the code and execute it.

- It should be concise— proper space management should be done; unnecessary spacing should be avoided.
- Please do not copy-paste program from online sources; plagiarism checker will be used to see if shows less than 7-8% relevance with other online materials. We will be using turnitin plagiarism checker available at NSU.

Report Submission:

1. 1st Update: After 4-5 Weeks
2. 2nd Update: After 9-10 Weeks
3. **Final submission***:* As per the final exam schedule.