LEARNING OUTCOME

- Adapt functional programs to solve computing problems using functional and logic programming language concepts. (P6, PLO3)
- Explain the features of modern non-strict functional languages by comparing behaviour against the standards of the paradigms. (C2, PLO1)

OVERVIEW

Programming paradigms can be defined as programming styles in problem solving. In software programing languages, there are distinct programming paradigms and a set of programming concepts used in the platforms. In practice, imperative programming like procedural or object-oriented paradigms are widely used in various programming platforms. Likewise, the declarative programming such as functional programming and logic programming paradigms can also be available in modern programming languages. In this assignment, therefore, focuses on programming paradigms primarily declarative programming paradigms for a specific problem solving.

REQUIREMENTS

Given the following situations in Task 1, Task 2 and Task 3. Study the scenarios and implement a GUI-driven computer program in accordance with the requirements. Following that, you are required to explain the programming concepts used within implementation. Often, the functional concepts such as purity, side effects, nullable, first-class function / higher order functions, generics, recursion, currying and partial application, functional composition and etc are considered. Apart from that, a knowledgebase file consisting facts and/or rules is created in regard of the logic programming paradigm.

Dataset:

1) time_series_covid19_confirmed_global.csv
2) time_series_covid19_deaths_global.csv
3) time_series_covid19_recovered_global.csv

Source: https://data.humdata.org/dataset/novel-coronavirus-2019-ncov-cases

Consider the given dataset for Novel Corona virus 2019 confirmed cases worldwide. Develop a computer program using multi-paradigm approach (Object-oriented, functional and logic programming paradigms) to visualise statistic data covering confirmed cases, death cases and recovered cases according to the given dataset.

TASK 1 [25 marks]:

Given the data sheets above, you are required to provide a series of functions, but not limited to, 1) display the total confirmed Covid-19 cases information; 2) compute the sum of weekly and monthly confirmed cases; 3) find the highest/lowest death and recovered Covid-19 cases; 4) appropriate data parser.

Marks Allocation:

Criteria	Marks
1) Display the total confirmed Covid-19 cases according to country	5
2) Compute the sum of confirmed cases by week and month for each country	5
3) Find the highest/lowest death and recovered Covid-19 cases as per country	5
4) Search/locate the country for Covid-19 cases covering confirmed, death and recovered cases.	5
5) Prepare appropriate data parser package (you may choose any available APIs for working with csv or excel documents)	5
Sub Total:	**25 marks**

TASK 2 [15 marks]:

Write Prolog statements that sort the confirmed Covid-19 cases accordingly ascending and descending order.

Marks Allocation:

Criteria	Marks
2) Knowledgebase file	5
2) Appropriateness of data structure used	5
3) Appropriateness of Prolog programming for sorting	5
Sub Total:	**15 marks**

TASK 3 [10 marks]:

Produce a technical report covering the programming concepts adopted in Task-1 and Task-2.

Criteria	Marks
1) Explanation of programming paradigms and concepts applied in Task-1 & Task-2.	5
2) Explanation of the features by strict and non-strict programming languages.	3
3) Quality of explanation	2
Sub Total:	**10 marks**

DELIVERABLE

- A final report comprising of the following elements:
  i. Introduction
  ii. Solution code for Task 1 and 2
    a. Source code snippets with explanation
    b. Screenshot of the running program
    c. Explanation of programming paradigm and concepts used in your solution
  iii. Short video for the program demonstration of Task 1 & 2
  iv. Conclusion
  v. Reference
- All related program files (source code)

SUBMISSION INSTRUCTION

- You are required to submit the assignment report consisting all essential parts as described in 'Deliverable' section at Moodle.
- Deadline: as per specified in Moodle

------ END OF DOCUMENT ------