SIMULA

19CSE100 - PROBLEM SOLVING AND ALGORITHMIC THINKING
PROGRAMMING LANGUAGE SURVEY ASSIGNMENT

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OUTLINE

INTENTION

The main OBJECTIVE of the Assignment includes ;

1. To **GAIN** or **ACQUIRE KNOWLEDGE** about a new programming language .
2. To Understand about the **FEATURES** and **PROBLEMS** with the language.
3. Implementation of the language in **REAL** Life **APPLICATION**.

INTRODUCTION

- Simula is a name of two simulation programming languages **SIMULA 1** and **SIMULA 67**, developed in the 1960s at the Norwegian Computing Centre in Oslo, by Ole-Johan Dahl and Kristen Nygaard.
- Simula is considered as a first **OBJECT-ORIENTED** programming language.
- Simula was designed for doing **SIMULATIONS** , and the needs of that domain provided the framework fro many of the features of Object-Oriented languages Today.

Lets Understand few Question in our Mind

What is SIMULATION ??

- Computer simulation is the process of mathematical modelling, performed on a computer, which is designed to predict the behavior of, or the outcome of, a real-world or physical system.

- For example, simulation helps car manufactures to virtually test the possibility of crashes. Instead of physically crashing dozens of new cars , researchers run simulations to see all possible scenarios that could occur to both the vehicle and passengers in a multitude of accidents. These simulations determine if the car is safe enough to drive.

- Some other example includes,

  1. **RESPONDING TO PANDEMICS**,
  2. **RESPONDING TO EARTHQUAKES** ,
  3. **EXPLORING BLACK HOLES** etc.

Lets Understand few Question in our Mind

What is OBJECTED-ORIENTED language??

- Object-Oriented Programming or OOPs refers to languages that use objects in programming.
- Object-oriented programming aims to implement real-world entities like inheritance, hiding, polymorphism, etc in programming.
- The main aim of OOP is to bind together the data and the functions that operate on them so that no other part of the code can access this data except that function.

HISTORY

- Kristen Nygaard started writing computer simulation programs in 1957.To go further with his ideas on a formal computer language for describing a system, Nygaard realized that he needed someone with more computer programming skills than he had. Ole-Johan Dahl joined him on his work January 1962.
- In Fall 1962 The concept of mathematical discrete event network and programming language reasoning for simula 1 was developed .
- Around 1963 Simula 1 would be implemented as a simulation procedure package along with a preprocessor to algol 60.Later it was implemented in many applications.

FEATURES

Simula introduced **objects,classes, inheritance** and **subclasses, virtual procedures, coroutines** and **discrete event simulation** .

01.CLASSES

A extensible program code template to create Objects.

02.OBJECTS

Variable ,constant, function , Data's are all called objects.

03.INHERITANCE

The mechanism of basing an object or class upon another object or class.

04.SUB-TYPING

It is a datatype that is relates to another datatype.

FEATURES

05.VIRTUAL METHODS

Method that can be redefined in derived class

06.ENCAPSULATION

- **Protected** with means that they are accessible for Sub-classes.
- **Hidden** in which case that are not accessible to subclasses.

07.INFLUENCED BY

1. **ALGOL60**
2. **Simscript**

FEATURES

08.INFLUENCED

1. BETA
2. CLU
3. Eiffel
4. Emeral
5. Pascal
6. Smalltalk etc

09.SUPPORTING OS

1. Unix-like, Windows, z/OS ,TOPS10 , MVS

REAL LIFE APPLICATION

01.PROCESS MODELLING

Process models are processes of the same nature that are classified together into a model. Thus, a process model is a description of a process at the type level.

02.COMMUNICATION PROTOCOLS

A communication protocol is a system of rules that allows two or more entities of a communications system to transmit information via any kind of variation of a physical quantity.

03.TYPESETTING

Typesetting is the composition of text by means of arranging physical type (or sort) in mechanical systems or glyphs in digital systems representing characters.

REAL LIFE APPLICATION

04.COMPUTER GRAPHICS

Computer graphics deals with generating images and art with the aid of computers.

05.VLSI

Very large-scale integration (VLSI) is the process of creating an integrated circuit (IC) by combining millions or billions of MOS transistors onto a single chip.

06.ALOGORITHMS

In mathematics and computer science, an algorithm is a finite sequence of rigorous instructions, typically used to solve a class of specific problems or to perform a computation.

IMPLEMENTATION

01. UNIVAC 1107

UNIVAC (Universal Automatic Computer) was a line of electronic digital stored-program computers.

02. SYSTEM/360

1. The IBM System/360 (S/360) is a family of mainframe computer systems.
2. It was the first family of computers designed to cover both commercial and scientific applications and to cover a complete range of applications from small to large.

IMPLEMENTATION

03.CDC 3000

The CDC 3000 series are a family of mainframe computers from Control Data Corporation (CDC). The first member, the CDC 3600, was a 48-bit system introduced in 1963.

04.TOPS-10

TOPS-10 System is a discontinued operating system from Digital Equipment Corporation (DEC) for the mainframe computer family.

BASIC PROGRAM

An example of a HELLO WORLD PROGRAM in Simula,

```
Begin
 OutText ("Hello, World!");
 Outimage;
End
```

Semicolon (;) in each line of the program indicates the termination of each line.

In SIMULA **Compilation** happen where the entire code is converted first to binary then execution happens.

PROBLEMS

01 . LANGUAGE FEATURES

1. Limited file access facilities.
2. No GUI support.
3. Missing data types(records , sets).
4. Long executable files for short programs.

02 . OOP FEATURES

1. No multiple inheritance.
2. No interfaces.

03 . SIMULATION

1. No automatic collection of statistics.
2. No report generator.
3. No specialized facilities.

THANK YOU