NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Computer Science and Engineering
College of Engineering

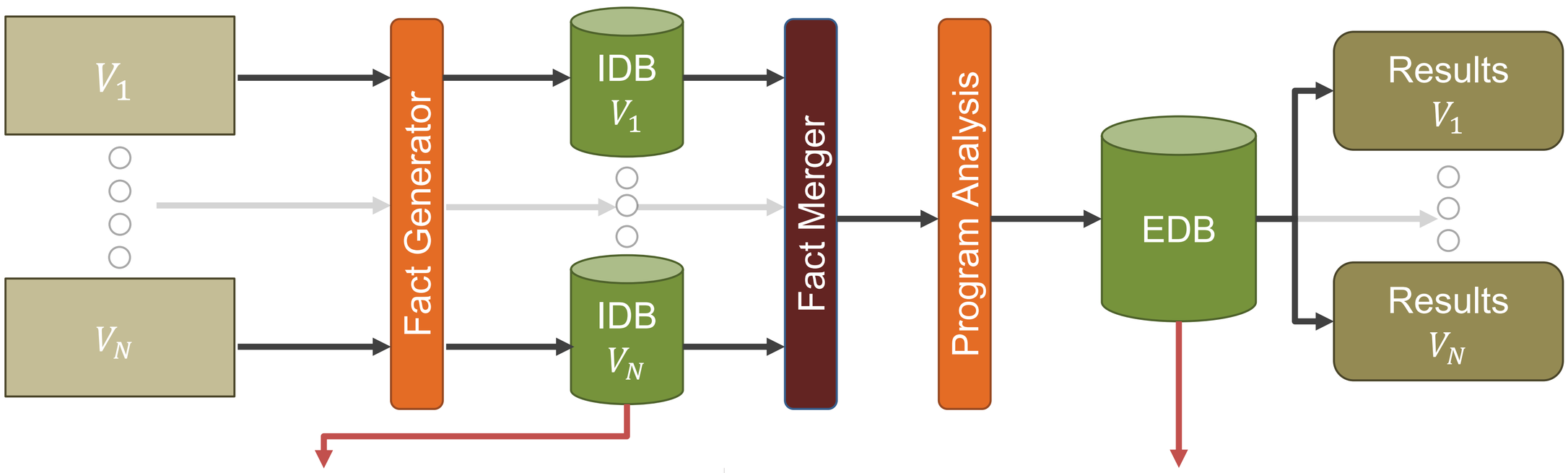
Analysis Lifting with Differential Facts

Student: Lin Yixiang, Leon **Supervisor:** Dr Li Yi

Project Objectives:

- Exploit the commonality of program facts across multiple versions to implement analysis lifting with differential facts
- Explore the benefits of lifted analysis, in terms of potential time and space savings

Architecture Overview



Intensional Database (IDB)

- Contains preliminary program facts

```
AssignLocal("VarA", "ClassA") @V1
AssignLocal("VarA", "ClassA") @VN
AssignLocal("VarB", "ClassB") @V1
```

Program Facts from V_1

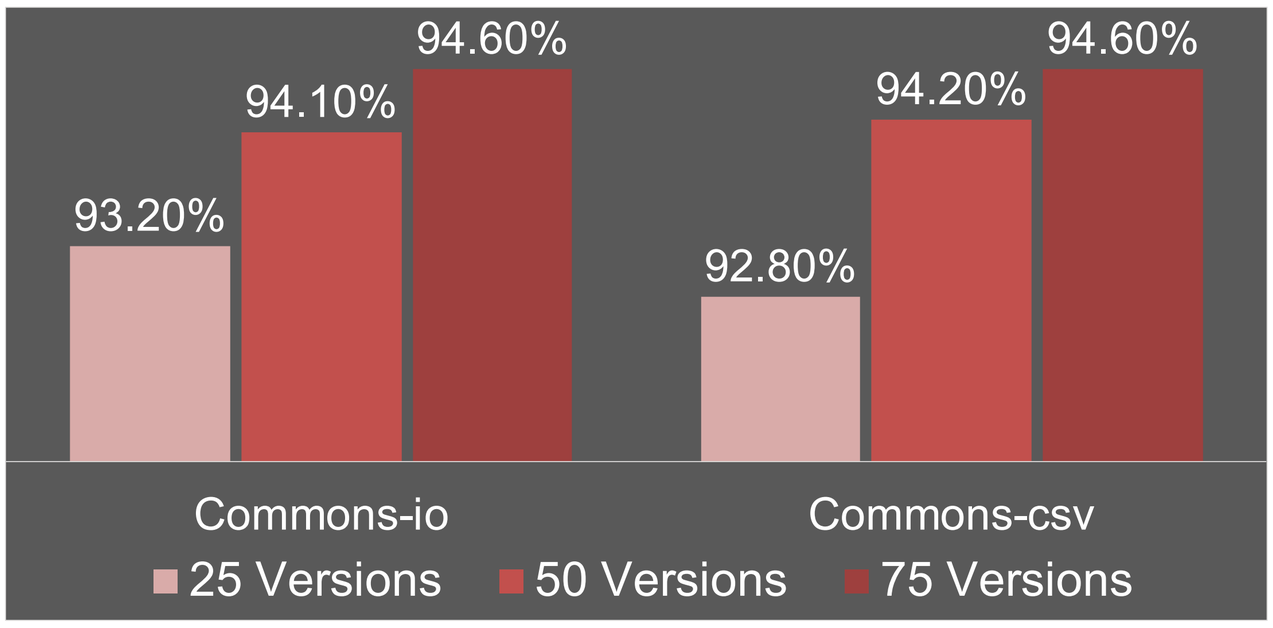
Extensional Database (EDB)

- Stores analysis results for all versions

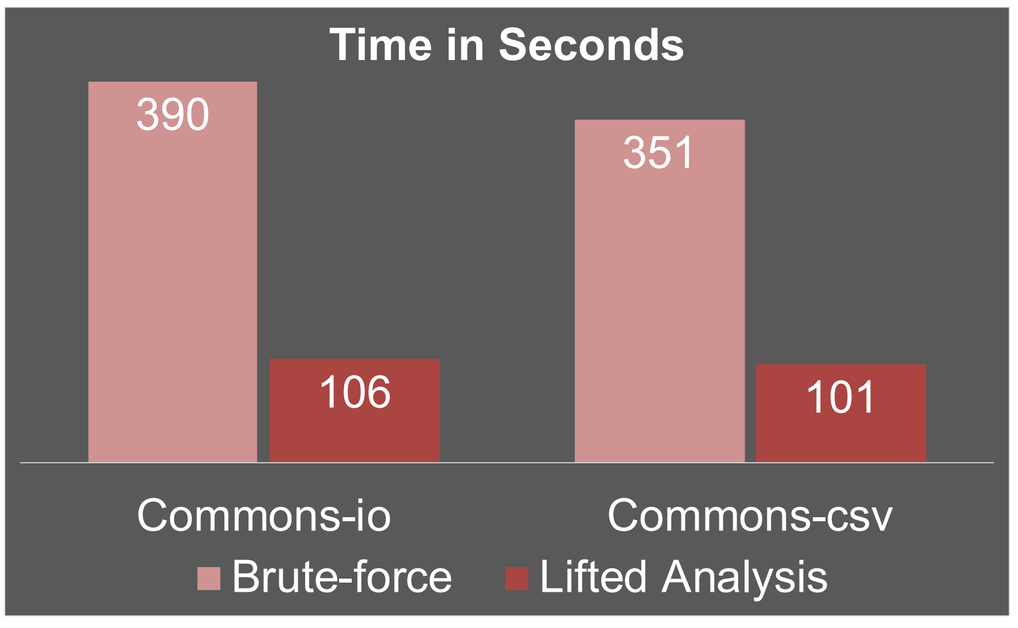
```
VarPointsTo("VarB", "ClassB") @V1
VarPointsTo("VarA", "ClassA") @V1 ∨ @VN
```

Result is in V_1 and V_N

Experiment Results



Space Savings for Various Version Lengths



Overall Time Savings for 5 Versions