

School of Computer Science and Engineering

Faculty of Engineering

The University of New South Wales

Exploring Just-in-Time Compilation in Relational Database Engines

by

Nicolaas Johannes van der Merwe

Thesis submitted as a requirement for the degree of
Bachelor of Computer Science (Honours)

Submitted: November 2024

Supervisor: Dr Zhengyi Yang

Student ID: z5467476

Abstract

Abbreviations

ACID Atomicity, consistency, isolation, durability

CPU Central Processing Unit

DB Database

EXP Expression (expressions inside queries)

IR Intermediate Representation

JIT Just-in-time (compiler)

JVM Java Virtual Machine

LLC Last Level Cache

MLIR Multi-Level Intermediate Representation

QEP Query Execution Plan

RA Relational Algebra

SQL Structured Query Language

SSD Solid State Drive

TPC-H Transaction Processing Performance Council

Contents

List of Figures

Chapter 1

Introduction

Lorem Ipsum

Chapter 2

Background

Chapter 3

Project

Lorem Ipsum

Conclusion

Lorem Ipsum

Acknowledgements

This work has been inspired by the labours of numerous academics in the Faculty of Engineering at UNSW who have endeavoured, over the years, to encourage students to present beautiful concepts using beautiful typography.

Further inspiration has come from Donald Knuth who designed \TeX , for typesetting technical (and non-technical) material with elegance and clarity; and from Leslie Lamport who contributed \LaTeX , which makes \TeX usable by mortal engineers.

John Zaitseff, an honours student in CSE at the time, created the first version of the UNSW Thesis \LaTeX class and the author of the current version is indebted to his work.