



QUEENSLAND UNIVERSITY OF TECHNOLOGY

SCHOOL OF MATHEMATICAL SCIENCES

MXB324: Computational Fluid Dynamics

Statement of Contribution

Group 007

Bond Consulting

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1 Introduction

In this document the group has outlined and recognised the contributions that every member has made towards this assignment. This report has been broken down into three sections: Coding Contributions which highlights the contributions made writing/debugging/editing code, Report Writing Contributions which indicates which members wrote which sections of the Analysis Report, and finally Other Contributions contains other general contributions made during the duration of this study.

Every group member has agreed and signed off on each of these sections.



Aidan Cowman (Signature)

01/11/19

Date



Dale Hebbard (Signature)

01/11/19

Date



Mitchell Johnson (Signature)

01/11/19

Date



Neco Kriel (Signature)

1st November 2019

Date



Samuel Dudley (Signature)

01/11/2019

Date

2 Coding Contributions

Code	Written By
MasterFile	Sam Dudley, Neco Kriel and Mitchell Johnson
PDESolver	Sam Dudley, Neco Kriel and Mitchell Johnson
NewtonS	Sam Dudley, Neco Kriel and Mitchell Johnson
JacobianBanded	Neco Kriel and Sam Dudley
Qcalc	Sam Dudley, Neco Kriel and Mitchell Johnson
FVM	Sam Dudley
calcPsi	Sam Dudley and Neco Kriel
calcSk	Sam Dudley and Neco Kriel
checkCFG	Sam Dudley
FluxCalculations	Sam Dudley and Neco Kriel
initial_h_conditions	Sam Dudley
initialCalculations	Sam Dudley
Upwinding	Sam Dudley and Neco Kriel
Arithmetic	Sam Dudley and Neco Kriel
Harmonic	Sam Dudley
setupMesh	Mitchell Johnson
simpleGradientMesh	Mitchell Johnson
fvm_mesh	Mitchell Johnson
fvm_node_type	Mitchell Johnson
fvm_mesh_type	Mitchell Johnson
rain_random	Aidan Cowman
rain_constant	Sam Dudley and Neco Kriel
rain_basic	Aidan Cowman, Sam Dudley and Neco Kriel
rain_average	Aidan Cowman

Table 1: This table highlights the contributions made by group members towards writing scripts or functions, and making contributions towards debugging or verifying code behaved correctly.

3 Report Writing Contributions

Analysis Report	Component	Team Member
Executive Summary		Neco Kriel
Model Background	Model Formulation and Description	Neco Kriel
	Mesh Discretisation	Mitchell Johnson
	FVM Discretisation of PDE Model	Sam Dudley
	Boundary Conditions	Sam Dudley
	Initial Conditions	Sam Dudley
Climate Modelling	River Flow	Sam Dudley
	Rainfall Models	Aidan Cowman
	Evapotranspiration	Sam Dudley
Extraction Modelling	Town Pumping Rates	Sam Dudley
	Coal Seam Gas Extraction	Sam Dudley
Analysis	Chosen Parameters for Analysis	Aidan Cowman and Dale Hebbard
	Steady States	Aidan Cowman
	Primary Analysis Results	Aidan Cowman and Dale Hebbard
Validation of Results		Dale Hebbard
Recommendations		Dale Hebbard
Conclusion		Dale Hebbard

Table 2: This table indicates which group member wrote which section of the final Analysis Report.

4 Other Contributions

Team Member	Other Contributions
Aidan Cowman	-
Dale Hebbard	Wrote Project Development Plan (v1 and v2) Moderated the Group's Weekly Meetings
Mitchell Johnson	Code debugging Mesh discretization Wrote Code architecture/Development Plan (v1 and v2) Developed visualisations for the system Helped with Statement of Contributions Helped Aidan with rainfall modelling Assisted with teaching code to team members Compilation of final code submission Hosted and maintained GitHub and Dropbox
Neco Kriel	Code debugging Formulated Richards' equation Wrote Code architecture/Development Plan (v2) Compiled and formatted the Analysis Report Wrote Statement of Contributions Compiled presentation slides PDE discretization Developed visualisations for the system Developed analysis code (tracking saturation and numerical solver's performance) Designed title pages (v2)
Sam Dudley	Code debugging PDE discretization Wrote Code architecture/Development Plan (v1 and v2) Developed skeleton structure of solver-code Developed "system-saving" code (saves regular updates of simulations) Designed title pages (v1)

Table 3: This table recognises those contributions made by group members beyond the tasks they have been assigned.