

# TABLE OF CONTENTS

ATTESTATION SHEET .....	i
CAPSTONE DESIGN BOOK .....	i
ORIGINALITY STATEMENT SHEET .....	ii
ORIGINALITY STATEMENT SHEET .....	iii
ORIGINALITY STATEMENT SHEET .....	iv
ABSTRACT.....	v
FOREWORD .....	vi
ACKNOWLEDGMENTS .....	vii
TABLE OF CONTENTS.....	viii
LIST OF IMAGES.....	xii
LIST OF TABLE .....	xxii
LIST OF ABBREVIATIONS.....	xxiii
CHAPTER 1 IDEA PROPOSAL .....	1
1.1 Background of the problem .....	1
1.2 Issue Support Information.....	2
1.3 General Analysis.....	2
1.3.1 Economic Aspect.....	2
1.3.2 Manufacturability Aspect .....	3
1.3.3 User Convenience .....	3
1.3.4 Healthcare Service .....	3
1.4 Needs to Be Met.....	3
1.5 Proposed System Solutions.....	3
1.5.1 Product Characteristics .....	4
1.5.2 Usage Scenarios.....	6
1.6 Conclusion and Summary CD-1 .....	7

CHAPTER 2 SOLUTION CONCEPT DESIGN .....	9
2.1 Product Specifications .....	9
2.2 Verification .....	11
2.2.1 Specification Verification 1 .....	11
2.2.2 Specification Verification 2.....	11
2.2.3 Specification Verification 3.....	12
2.2.4 Specification verification 4.....	12
2.2.5 Specification verification 5.....	13
2.2.6 Specification verification 6.....	13
2.2.7 Specification verification 7.....	14
2.3 Conclusion and Summary CD-2 .....	14
CHAPTER 3 SOLUTION DESIGN.....	15
3.1 System Concept .....	15
3.1.1 System Options.....	15
3.1.1.1 Blood Pressure Measurement Tool Design .....	15
3.1.1.2 Blood Pressure Category Indicator .....	16
3.1.1.3 Blood Pressure Measurement Tool Integrated Application.....	18
<b>3.2 Analysis</b> .....	18
3.2.1 Criteria .....	18
3.2.2 Concept Analysis .....	19
3.2.2.1 Blood Pressure Measurement Tool.....	19
3.2.2.2 Blood Pressure Category Indicator.....	19
3.2.2.3 Blood Pressure Measurement Mobile Application.....	20
<b>3.3 Systems to be Developed</b> .....	20
3.4 System Design Plan .....	22
3.5 Component Testing.....	25
3.6 Work Schedule.....	25

3.7 Conclusion and Summary CD-3 .....	26
CHAPTER 4 IMPLEMENTATION.....	27
4.1 System Implementation .....	27
4.1.1 Blood Pressure Measurement Tool.....	27
4.1.2 Blood Pressure Category Indicator .....	47
4.1.3 Mobile Application .....	64
4.2 Analysis of System Implementation Work.....	71
4.3 System End Results .....	72
4.4 Conclusion and Summary CD-4.....	73
CHAPTER 5 SYSTEM TESTING .....	74
5.1 System Testing Scheme .....	74
5.2 Testing Process .....	74
5.2.1 Sensor Accuracy Test .....	74
5.2.2 Tool Functionality Test.....	75
5.2.3 Tool Accuracy Test.....	77
5.2.4 Mobile Application Functionality Test.....	83
5.2.5 Blood Pressure Category Prediction .....	86
5.2.6 Quality of Service of Firebase .....	292
5.3 Analysis of Test Results .....	296
5.3.1 Analysis of Blood Pressure Measurement Tool .....	296
5.3.2 Analysis of Blood Pressure Category Indicator Test Results .....	296
5.3.3. Analysis of Mobile Application.....	314
5.4 Conclusion and Summary CD-5 .....	314
BIBLIOGRAPHY .....	316
CD-1 APPENDIX.....	318
CD-2 APPENDIX.....	327
CD-3 APPENDIX.....	340

CD-4 APPENDIX.....	341
CD-5 APPENDIX.....	375