BINARY BUBBLE SHOOTER: A GAME ABOUT NUMBER SYSTEM AND CONVERSION

Undergraduate Thesis
Submitted to the Faculty of
College of Engineering and Information Technology
Cavite State University
Indang, Cavite

In partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science

ALJOSEPH P. BAGO LAWRENCE R. SANGANGBAYAN December 2018



Republic of the Philippines

CAVITE STATE UNIVERSITY

Don Severino de las Alas Campus Indang, Cavite

COLLEGE OF ENGINEERING AND INFORMATION TECHNOLOGY

Department of Information Technology

AUTHORS: AL JOSEPH P. BAGO and LAWRENCE R. SANGANGBAYAN

TITLE: BINAR

BINARY BUBBLE SHOOTER: A GAME ABOUT NUMBER SYSTEM AND

CONVERSION

APPROVED:

JULIE ANN C. LONTOC

Adviser

//79-8 Date

EZRA MARIE F. RAMOS

Technical Critic

 $\frac{\sqrt{2}-5-20/8}{\text{Date}}$

RIA CLARISSE L. MOJICA

Unit Research Coordinator

12/5/18 Date MARLÓN R. PEREÑA
Department Chairperson

Date

SHERYL D. FENOL

College Research Coordinator

12/11/2018

-

MARILYN M. ESCOBAR

Dean

Date

MA. CYNTHIA R. DELA CRUZ

Director for Research

12/12/18 Date

ABSTRACT

BAGO, ALJOSEPH P. and SANGANGBAYAN, LAWRENCE R. Binary Bubble Shooter: A Game About Number Systems And Conversion. Undergraduate Thesis. Bachelor of Science in Computer Science, Cavite State University, Indang Campus. December 2018. Adviser: Julie Ann C. Lontoc.

Binary Bubble Shooter: A Game About Number System And Conversion was developed to provide an educational game to help computer related courses to understand more about binary conversion and at the same time enjoying. The game is created through the form of shooting game. Shooting games like *ZUMA* and *PUZZLE BUBBLE*. The study was conducted from February 2018 to October 2018 at Cavite State University - Main Campus.

In developing the game software, iterative development process was used. One hundred college students of Cavite State University -Main Campus evaluated the system. A software evaluation sheet based on ISO 9126 was used as the research instrument.

The overall result of software evaluation with the criteria of functionality, usability, efficiency, and portability shows that the software was excellently done. It means that the proponents met all the expectation and desired output for the developed software.

TABLE OF CONTENTS

| | Page |
|------------------------------------|------|
| BIOGRAPHICAL DATA | ii |
| ACKNOWLEDGEMENT | iii |
| ABSTRACT | V |
| LIST OF TABLES | viii |
| LIST OF FIGURES | ix |
| LIST OF APPENDIX TABLES | X |
| LIST OF APPENDIX FIGURES AND CHART | xi |
| LIST OF APPENDICES | xii |
| INTRODUCTION | |
| Statement of the Problem | 3 |
| Objectives of Study | 4 |
| Significances of Study | 4 |
| Time and Place of the Study | 5 |
| Scope and Limitation of the Study | 5 |
| Theoretical Framework | 7 |
| Definition of Terms | 10 |
| REVIEW OF RELATED LITERATURE | 11 |
| Related Studies | 17 |
| METHODOLOGY | 24 |
| Materials | 26 |

| Methods | 26 | |
|--|----|--|
| RESULT AND DISCUSSION | | |
| Planning and Requirements | 28 | |
| Design and Implementation | 29 | |
| System Overview | 31 | |
| Software Testing and Evaluation | 38 | |
| SUMMARY, CONCLUSION, AND RECOMMENDATIONS | 43 | |
| Summary | 43 | |
| Conclusion | 44 | |
| Recommendations | 45 | |
| REFERENCES | 46 | |
| APPENDICES | 12 | |

LIST OF THE TABLES

| Table | | Page |
|-------|--|------|
| 1 | Features of related study and developed study | 21 |
| 2 | Features of related software and developed study | 22 |
| 3 | Contribution of the related studies to the developed study | 23 |
| 4 | Participants' evaluation of the software in terms of its functionality | 40 |
| 5 | Participants' evaluation of the software in terms of its usability | 40 |
| 6 | Participants' evaluation of the software in terms of its efficiency | 41 |
| 7 | Participants' evaluation of the software in terms of its portability | 41 |
| 8 | Summary result of the evaluation | . 42 |

LIST OF FIGURES

| Figure | | Page |
|--------|---|------|
| 1 | "Binary Bubble Shooter" theoretical framework | 9 |
| 2 | Concept of Randomized Algorithm (Puntambekar, 2009) | 12 |
| 3 | Iterative development process model (Ghahrai, 2008) | 25 |
| 4 | Screen hot of the configuration form | 31 |
| 5 | Screenshot of the control form | 31 |
| 6 | Screenshot of the main menu | 32 |
| 7 | Screenshot of the registering form | 33 |
| 8 | Screenshot of the option menu | 33 |
| 9 | Screenshot of the instruction menu1 | 34 |
| 10 | Screenshot of the instruction menu2 | 34 |
| 11 | Screenshot of the instruction menu3 | 35 |
| 12 | Screenshot of the levels or category | 35 |
| 13 | Screenshot of the select level form | 36 |
| 14 | Screenshot of the main game | 36 |
| 15 | Screenshot of the decimal mode | 37 |
| 16 | Screenshot of the octal mode | 37 |
| 17 | Screenshot of the hexadecimal mode | 38 |

LIST OF APPENDIX TABLES

| Appendix Tables | | Page |
|--------------------|---|------|
| 1 | Frequency distribution of scores of the functionality indicator | 50 |
| 2 | Frequency distribution of scores of the usability indicator | 50 |
| 3 | Frequency distribution of scores of the efficiency indicator | 50 |
| 4 | Frequency distribution of scores of the portability indicator | 50 |

LIST OF APPENDIX FIGURES AND CHARTS

| pendix igures | | Page |
|----------------------|--|------|
| 1 | Fishbone diagram (Lack of awareness in Conversion of Numeral System) | 52 |
| 2 | Fishbone diagram (No such advocacy in a game) | 53 |
| 3 | Fishbone Diagram (Lack of action in studying the Conversion of Numeral System) | 54 |
| 4 | Survey outcome(chart) | 55 |
| 5 | Gantt Chart | 57 |

LIST OF APPENDICES

| Appendix | | Page |
|----------|---|------|
| 1 | Sample survey form | 59 |
| 2 | Sample accomplished survey form | 62 |
| 3 | Sample software evaluation sheet | 65 |
| 4 | Sample accomplished software evaluation sheet | 68 |
| 5 | Unit testing | 71 |
| 6 | Performance testing | 78 |
| 7 | Usability testing | 80 |
| 8 | Sample source code | 82 |
| 9 | Letters, forms, certificate, etc | 86 |