



PROJECT REPORT  
Implementation of Optimizing Two-dimensional  
Guillotine Cut by Genetic Algorithm

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12.02.0008

2016/2017

INFORMATICS ENGINEERING DEPARTMENT  
FACULTY OF COMPUTER SCIENCE  
SOEGIJAPRANATA CATHOLIC UNIVERSITY

**APPROVAL AND RATIFICATION PAGE**

**PROJECT REPORT**

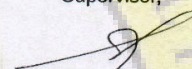
Implementation of Optimizing Two-dimensional Guillotine Cut by Genetic Algorithm

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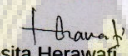
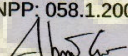

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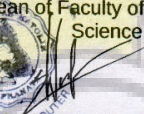
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**STATEMENT OF ORIGINALITY**

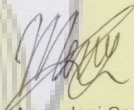
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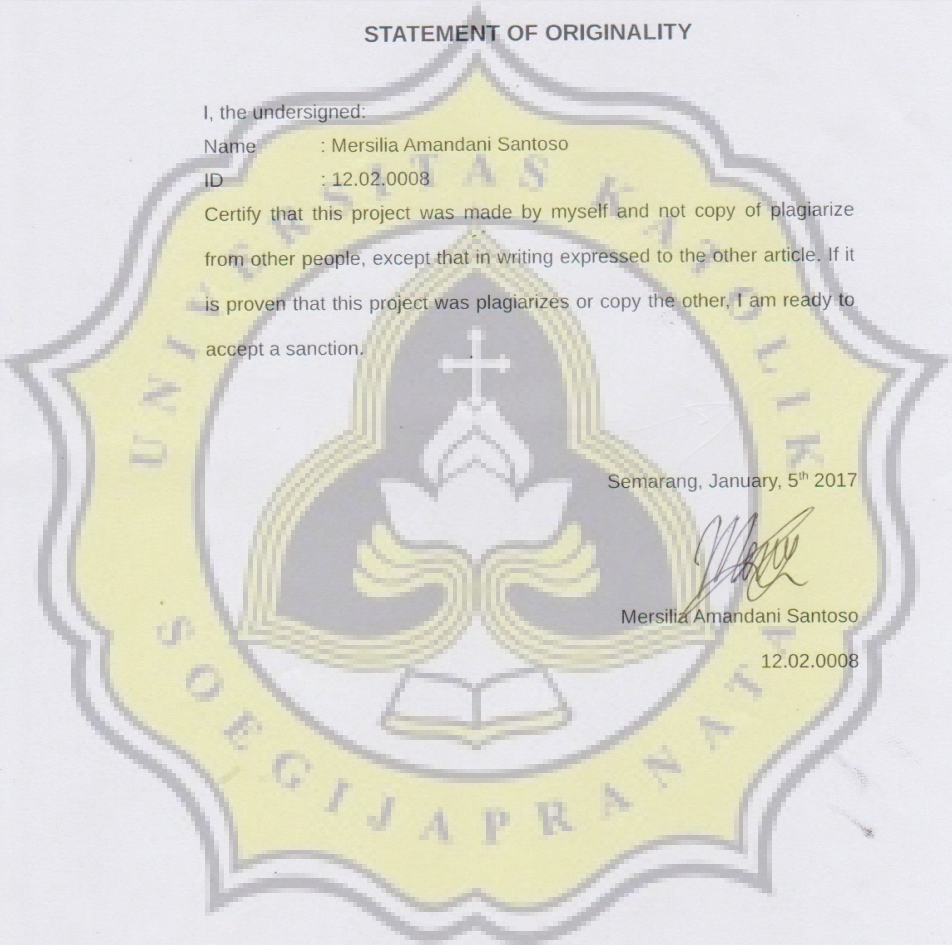
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## FOREWORD

Praise the Lord Jesus , I'm finally able to finished my final project titled "Implementation of Optimizing Two-dimensional Guillotine Cut by Genetic Algorithm". This final project was filled to qualify for graduation at Informatics Engineering Department, Faculty of Computer Science, Soegijapranata Catholic University, Semarang.

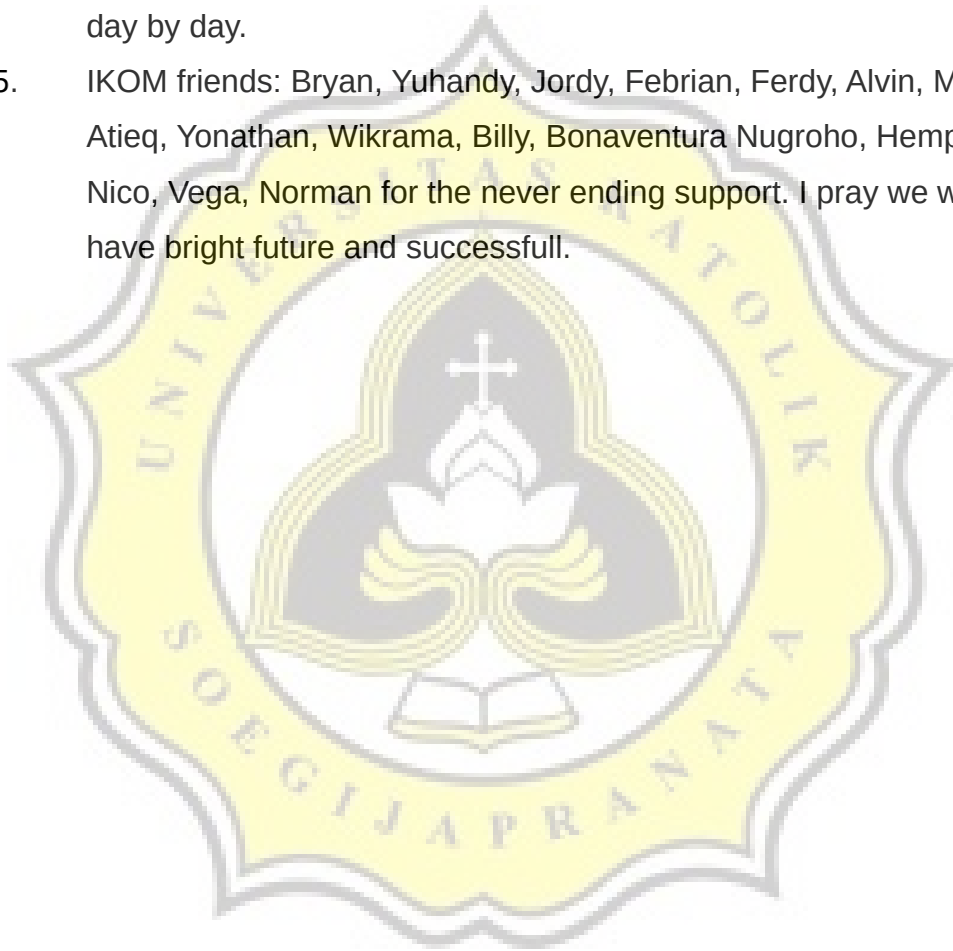
In the process of making this project I had retreated one semester due to bad health conditions that make me unable to walk until 4 months. I feel very sad but I need to restore my health first. I can start do this project again in the next semester. All of support and love are so important for me, I can't do this alone without it. The struggles, tears and headache paid off after I passed final presentation. I will always remember this experience because it teach me that no result were betrayed the effort. Patient is a key when I faced so many error in my program, in every struggle I keep trying because I know there is a way to lead me reach a Bachelor in Computer Science.

In this opportunity I would thank to:

1. Jesus Christ, for give me abundantly love, blessings, amazing experience, healthy, and ability to finished this project.
2. My Parents, for pray, love,the financial support and uplifting me in down circuntances. Also to my sister for cheer me up. I hope in further I can bring lots of happiness to my family.
3. Mr. Suyanto Edward Antonius, Ir., M.Sc as a supervisor for the guidance make this project, Mr. Hironimus Leong, S.Kom., M.Kom for suggested the title about glass cutting stock problems, Mrs. Rosita Herawati, ST., MIT for the Java programming lessons, Mrs. Shinta Estri Wahyuningrum, S.Si, M.Cs for suggested genetic

algorithm, Mr. Erdhi Widyarto Nugroho, ST., M.T as Dean of Computer Science Faculty for the graduation ratification, and also all lecturers who have taught me for 4 years in IKOM.

4. My beloved The, Charles Raymond Lundy for accompanied me in my struggling moment, give motivations and encouragement me day by day.
5. IKOM friends: Bryan, Yuhandy, Jordy, Febrian, Ferdy, Alvin, Mentari, Atieq, Yonathan, Wikrama, Billy, Bonaventura Nugroho, Hempi, Nico, Vega, Norman for the never ending support. I pray we will have bright future and successfull.



## PREFACE

The project report titled “Implementation of Optimizing Two-dimensional Guillotine Cut by Genetic Algorithm” was made for one of graduation requirement as an explanatory to the readers. This project describe about the optimizing arrangement process of different size rectangles into a main glass sheet using guillotine cut layout algorithm and genetic algorithm. This project research organizes into six chapters.

Three part in *first chapters* are background, scope which contain some of the limitation, and objective that describe the purpose of this project.

The *chapter two* explained the literature study, data structure and two algorithm that used in this project briefly . Two algorithms are guillotine cut, and genetic algorithm.

This project is done after going through with planning several step for the research methodology, then make timetable or the project management on *chapter three*.

*Chapter four* describe the algorithm analysis , data preparation, and design of program's operation.

*Chapter five* describe implementation of both algorithm combination in java coding and then testing the program whether it is in accordance with the goal or not.

Lastly, *chapter six* provides conclusions about this project also further research.

## ABSTRACT

Cutting two-dimensional sheet into a many rectangular parts with different size need complex layout arrangement. One method to optimizing the layout is guillotine cut. In guillotine cut, some rectangular parts cut edge to edge on a sheet. Guillotine cut layout algorithm processes the layout arrangement in order to make guillotine cut possible. To complete the guillotine cut, the arrangement is optimizes by genetic algorithm to make optimum waste area percentage (lowest percentage).

This program reads the weight, length, and ID number of some rectangular parts from txt file. Next step, the program saves the rectangles data (number) from txt file into array. The genetic algorithm reads ID data from array and shuffles the sequence. After ID data sequence shuffled, program sends rectangles data to guillotine cut layout algorithm. The guillotine cut layout algorithm changes rectangles data into rectangles shapes (picture) and enter it in a two-dimensional sheet sequentially. The layout arrangement is following new sequence ID data which already shuffled before. Not necessarily all rectangles can entered in a sheet. There is a logic in guillotine cut algorithm which only save entered ID number and count total waste area after the rectangles entered. Genetic algorithm will generating 1000 times and save all waste area percentage. Final step, is searching the optimum percentage with most total ID number of rectangles then the program will show one of layout picture which has optimum result as an output.

**Keywords:** *Genetic Algorithm, Guillotine Cut, Two-dimensional Cutting*

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