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بسم الله الرحمن الرحيم

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التوثيق الالكتروني والميكروفيلم

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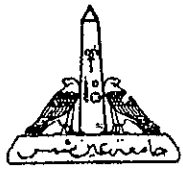

ON ALGORITHMIC GRAPH THEORY
GRAPH LABELLING ALGORITHMS

THESIS

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS
FOR THE DEGREE
OF
MASTER OF SCIENCE
(COMPUTER SCIENCE)

BY
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M. SC. Courses

Beside the work carried out in this thesis, the candidate has attended graduate courses for one year in computer science, covering the following topics:

1- Syntax and Semantics.

2- Theory of Computation and Complexity.

3- Theory of Program and Data Structures.

4- Prolog and Artifial Intelligence.

5- Functional Programming.

She has successfully passed written examinations in these courses.

Prof.Dr. Entisarat El-Shobaky

Head of Mathematics Department.

Preface

In this thesis, firstly, we have read the avaliable literature on the subject of graph theory, and then we have searched for some unsolved problem.

Our selected problem is the gracefulness of trees or, in other words: Is every tree graceful ? .

We prove the gracefulness of some special cases of trees,such as the star, the path, and a generalized star which is a tree in which there is a unique vertex having degree ≥ 3, and all other vertices have degree less than or equal 2. We study two cases of the generalized star. The first is a generalized star in which all branches are equal, and the second case is a generalized star in which all branches execpt one have the same length.We prove the gracefulness of the generalized star in both cases. Finally, we suggest an algorithm to check whether a tree is graceful or not . Also, we suggest another algorithm to generate all trees with a given number of vertices .

We suggest further algorithm to generate trees of order $n+1$ by knowing the diagrams of trees of order n.

This thesis contains six chapters. Chapters 1 and 2 give a background about the concepts of graph theory. Chapter 3 is talking about the concept of gracefulness of graphs, and introduces some new results about the graceful graphs. Chapter 4 contains some new results about the gracefulness for some special cases of trees, and introduces the concept of joint sum of two graceful trees. Finally, in Chapter 5, we introduce the algorithm which checks whether a tree is graceful or not, while Chapter 6, introduces an algorithm for generating all trees just by knowing the order n. Also in this chapter, we introduce another algorithm for generating all trees of order $n+1$ by knowing all diagrams of trees of order n.

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