IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

A REAL TIME APPLICATION OF GRAPH THEORY USING SOFTWARE TESTING APPROACH

[1]Dr.M.Prabhavathi Professor & HOD
E.G.S Pillay Arts & Science College, Nagapattinam

[2]Mr.M.Abinaya
Teacher
Sri Sankara Hr.Sec.School,Peralam

Abstract: In this Paper intutionistic fuzzy graghs with four operations namely cartesion product, composition, tensor product, normal product are defined.Also ,the degrees of the vertices of the resultant graphs which are obtained from two given intuionistic fuzzy graphs G_1 and G_2 using the operations direct product , cartesion product and complement on intuitionstic fuzzy graphs. Soft computing is the use of approximate calculations to provide imprecise but usable solutions to complex computational problems. The approach enables solutions for problems that may be either unsolvable or just too timeconsuming to solve with current hardware. Soft computing is sometimes referred to as computational intelligence. As a field of mathematical and computer study, soft computing has been around since the 1990s. The inspiration was the human mind's ability to form real-world solutions to problems through approximation. Soft computing contrasts with possibility, an approach that is used when there is not enough information available to solve a problem. In contrast, soft computing is used where the problem is not adequately specified for the use of conventional math and computer techniques. Soft computing has numerous real-world applications in domestic, commercial and industrial situations.

Keywords:

Graph, Simple graph.
Euler circuit , Eulerian graph, Software testing,Types of software testing.

I. Introduction

In 1965, Zadeh [21] represented the uncertainly as intuitionistic biopolar

fuzzy subset of sets. Since than the theory of fuzzy sets has become a vigorous area of research in different disciplines including medical and life sciences, management sciences, social sciences, engineering, statistics, graph theory, artificial intelligence, signal processing, meeltiagent systems, pattern recognition, robotics, computer networks, , decision making, automata theory, etc. Graph theory has numerous applications to problems in computer science, networking routing, system analysis, electrical engineering, operations research, economics, transportation and many others. In many cases some aspects of a graph theoretic problem may be uncertain. The bipolar fuzzy sets have been explained by Zhang [22] in 19 Zhang extended the fuzzy sets as bipolar fuzzy sets by assigning the membership value in the range [-1,1].

In a bipolar fuzzy set, the membership degree 0 of an element means that the element is irrelevant to the corresponding property, the membership degree [0,1] of an element indicates that the element somewhat satisfies the property, and the membership degree [-1,0] of an element indicates the element somewhat satisfies the implicit counter property.

The generalized bipolar fuzzy graphs.Atanassov[5] introduced the concept of intuitionistic fuzzy set as a generalization of fuzzy sets.Atanassov added a new components which determines the degree of non- membership in the definition of fuzzy set. In 1975,Rosenfeld [16] discussed the concept of bipolar fuzzy graphs. Sahoo and pal[11] discussed the concept of intuitionistic fuzzy competition graph. They also discussed intuitionistic fuzzy tolerance graph with application [12], different types of products on intuitionistic fuzzy graph [10] and product of intuitionistic fuzzy graph and their degrees [13].

Software testing arrived alongside the development of software,which had its beginnings just after the second world war.Computer scientist Tom Kilburn is credited with writing the first piece of software,which debuted on june 21, 1948, at the University of

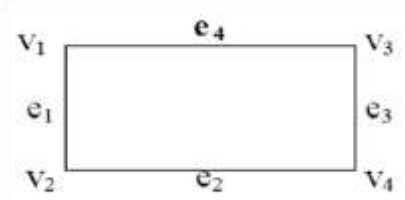
Manchester in England.It performed mathematical calculations using machine code instructions.By the 1980s,development teams looked beyond isolating and fixing software bugs to testing applications in real - world setting.

Preliminaries:

In this section,we discuss about definitions are used to prove the main results. **II. Basic definition**

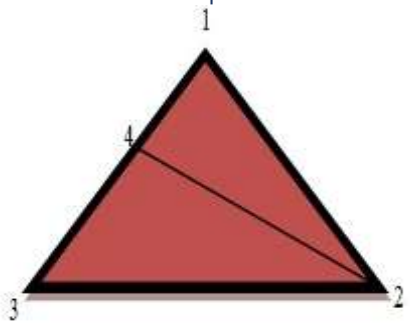
Definition : 2.1

- A set of points and lines joining these points.
- G=(V,E)



Definition : 2.2

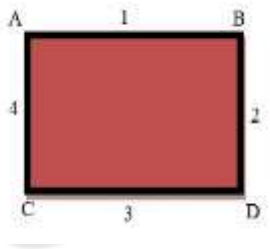
A graph that has neither self - loops nor parallel,edges is called a simple graph.



Definition : 2.3

Euler circuit is a circuit in graph G which traverses every edge of graph exactly once.Euler circuit is simply a closed path and called as Euler line.

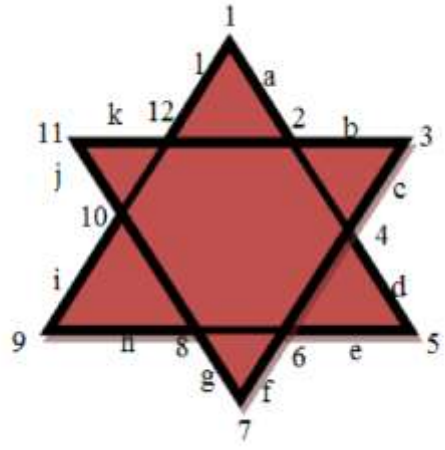
Example: has euler circuit ABDCA as each edge appears exactly once and it is closed.



A1B2D3C4

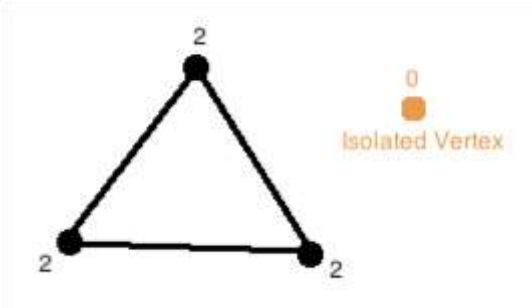
Definition : 2.4

A graph which contains either Euler path or Euler circuit is called eulerin graph.



Definition : 2.5

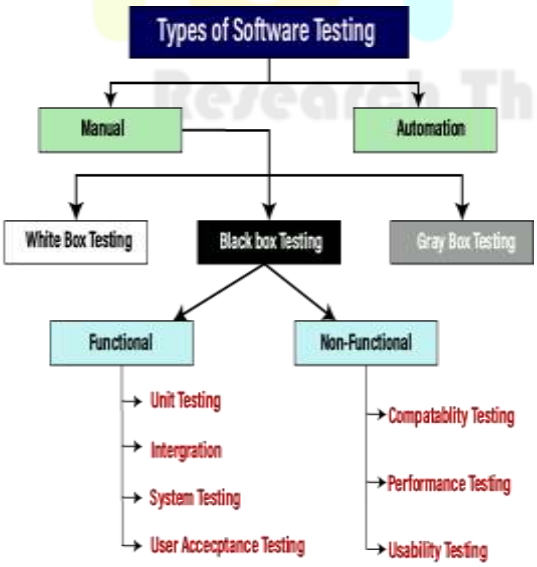
An isolated vertex is a vertex with degree zero,that is a vertex that is not an endpoint of any edge.



III.Software testing:

Definition: 3.1 Software testing is a method to check whether the actual software product matches expected requirements and to ensure that software product is Defect free.It involves execution of software/ system components using manual or automated tools to evaluate one or more properties of interest.The purpose of software testing is to identify errors,gaps or missing requirements in contrast to actual requirements.

Types of software testing:



IV. Strong intuitionistic bibolar fuzzy graph

Definition:4.1 A strong intuitionistic bipolar fuzzy graph $G = (\mu, \lambda)$ is called a strong intuitionistic bipolar fuzzy graph of $G = (V, E)$ if

$$\lambda^P(xy) = \frac{\mu^P(x)\mu^P(y)}{\mu^P(x)+\mu^P(y)-\mu^P(x)\mu^P(y)}$$

and

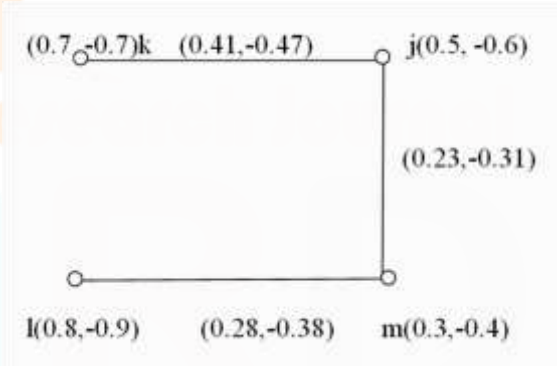
$$= \frac{\lambda^N(xy)}{\mu^N(x)\mu^N(y)} \frac{\mu^N(x)\mu^N(y)}{\mu^N(x)+\mu^N(y)-\mu^N(x)\mu^N(y)}$$

for all $xy \in E$.

Example:3.1 consider a intuitionistic bipolar fuzzy graph over $V = a, b, c, d$ defined by

$$X = \{\frac{j}{-0.6}, \frac{k}{-0.7}, \frac{l}{-0.9}, \frac{m}{-0.4}\}$$

$$Y = \{\frac{jk}{-0.47}, \frac{jm}{-0.3}, \frac{lm}{-0.38}\}.$$



Conclusion:

Software testing is an important part of the software development process.It is not a single activity that takes place after code implementation,but is part of each stage of the lifecycle. A successful test strategy will begin consideration during requirements specification.

REFERENCE:

[1] Atanassov K.T .,(1986) IntutionistiAc fuzzy sets . fuzzy sets and system 20 :87-96.

[2] Hai-long Yang et al. (2013).Note on "Bipolar fuzzy graphy ". Information science 242 :113-121.

[3] Mordeson J.N., Nair P.S .,(2001). Fuzzy Graphs and Fuzzy Hypergraphs . Heidelberg : Physical verlage.

[4] Mordeson J.N., Peg C.S., (1994). Operation on fuzzy graph . information science 79 : 159- 170.

[5] Pal M., SamantraS ;, Rashmanmou H ., (2015). Some result on interval valued fuzzy graphs. Intenation journal of Algorthima, computer and mathematics 2:107-116.

[6] Rashmanlou H ., Pal M ., (2013) . Balanced interval valued fuzzy graphs . Journalof physical sciences 17:43-57.

[7] Rashmanlou H.,Samanta S., Pal M ., Borzooei R., A ., (2015) A study on bipolar fuzzy graphs. Joural of inlligent and fuzzy system 28 :571-580.

[8] Rashmanlou H.,Samanta S., Pal M ., Borzooei R., A ., (2015) Bipolar fuzzy graphs with categorical properties. The internation journal of computation intelligence system 8(5) : 808- 818.

[9] Rosenfield A., (1975). Fuzzy graphs. Fuzzy sets and their application (L.A . Zadeh K.SFu,M. Shimura ,Eds) Academics press newyork :77-95.

[10] Sahoo S Pal M (2015) different types of product on intuitionistic fuzzy grapypacific science review A : natural science and enginneering 17(3):87-96.

[11] Sahoo S Pal M (2015) intuitionistic fuzzy competition graphjournalof applied mathematics and computing 52(1):37-57.

[12] SahooSPalM(2016)intuitionsicfuzzytolarancegraphy withapplicationjournalof applied mathematics and computing DOI :10.1007/s12190-016-1047.

[13] Sahoo S Pal M (2016) Product of intuitionistic fuzzy grapgs and degree Journalof intelligent and fuzzy system 32(1):10591067.

[14] sSamantaS.,PalA.,PalM .,(2014)Newconceptoffuzzy p lanargraphsinternational journal of advance research in artifical intelligence 3(1) :52-59.

[15] Samanta S., Pal M ., (2011). Fuzzy threshold graphs. CIIT International journal of fuzzy system 3:360-364.

[16] Samanta S., Pal M ., (2011). Fuzzy tolerance graphs. International journal of Latest Trends in Mathematics 1:57-67.

[17] Samanta S., Pal M., (2012). Irregular bipolar fuzzy graphs. International journalof Applications of fuzzy sets2:91-102.

[18] SamantaS.,PalM.,(2013).Fuzzykcompetitiongraphandpcompetitionfuzzygraphs. Fuzzy information and Engineering5:191-204.

[19] SamantaS.,PalM.,(2014) .Somemoreresultsonbipolarfuzzysetsandbipolarfuzzy intersection graphs. The journal of Fuzzy Mathematics22(2):253-262.

[20] SamantaS.,PalM.,(2015) .Fuzzyplanargraph.IEEETransactiononFuzzySystems, 23(6):1936-1942.

[21] Zhang W., R., (1994). Bipolar fuzzy sets and relations: a computational framework for cognitive modelling and multiagent decisions analysis. Proceedings of IEEEConf(1994):305-309.

[22] Zadeh L., A., (1965). Fuzzy set. Information and Control8:338-353.

[23] Snia Mandal, Madhumangal Pal A new operation on bipolar intuitionstic fuzzygraphs. TWMS J. App Eng. Math. V.9, N.2, 2019, pp.327-338.