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Application of Domination Set for Fixing Surveillance Cameras

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Abstract- Graphs are both natural and human made structures. This paper is about the introduction of a new method for fixing a minimum number of surveillance cameras in any place by using the concept of domination sets.

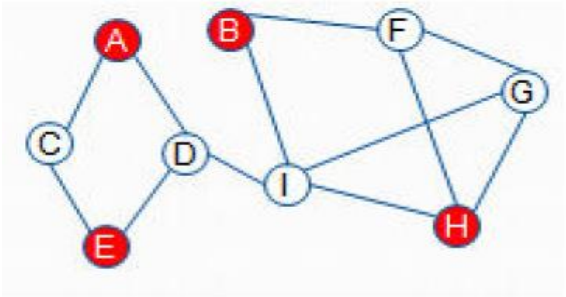
Keywords: Domination set, Minimum domination set.

I. INTRODUCTION

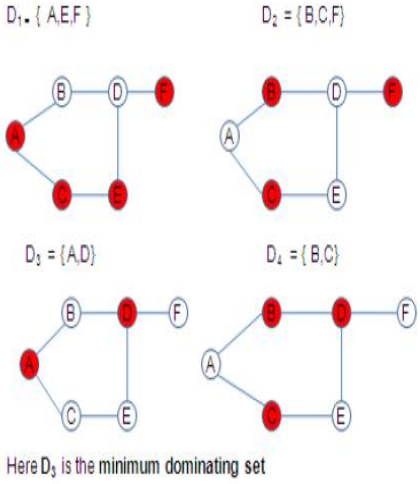
The main aim of this paper is to present the importance of graph theoretical ideas in various areas of Science & Engineering for researches that they can use Domination in graph theoretical concepts for the research. Domination in graphs has been an extensively researched branch of graph theory. It is clearly established from the exclusive coverage of the "Topics on domination in graph" in the 86th issue of the Journal of Discrete mathematics (1990), that the theory of domination is a very popular area for research activity in graph theory. In 1958, Berge defined the concept of the domination number of a graph, calling this as "coefficient of External Stability". In 1962, Ore used the name "dominating set" and "domination number" for the same concept. They have used the notation (G) for the domination number of a graph, which has become very popular in real life.

II. DEFINITIONS

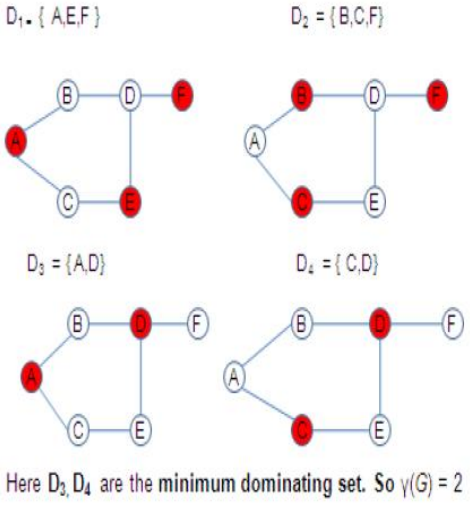
Domination set: In graph theory, a dominating set for a graph G=(V,E) is a subset D of V such that every vertex not in D (every vertex in V-D) is joined to at least one member of D by some edge.
(i.e.) A set D of vertices in a graph G is called a domination set of G if every vertex in V-D is adjacent to some vertex in D.
Eg: In the following graph G, the set D=(A,B,E,H) is one of the dominating set



Minimum Dominating set: A dominating set D is said to be minimum dominating set if D consist of minimum number of vertices among the all dominating sets.
Eg: Consider the following graph G



Domination number: The domination number is the number of vertices in a smallest dominating set for G. (The cardinality of minimum dominating set)
Eg: Consider the following graph G



Minimal dominating set: A dominating set D is called minimal dominating set if no proper subset of D is a dominating set.
Eg: Consider the following graph G

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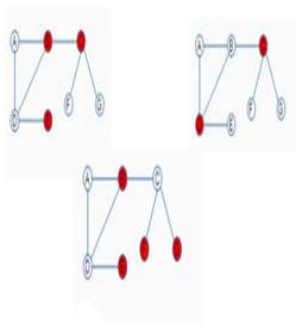
Ex.



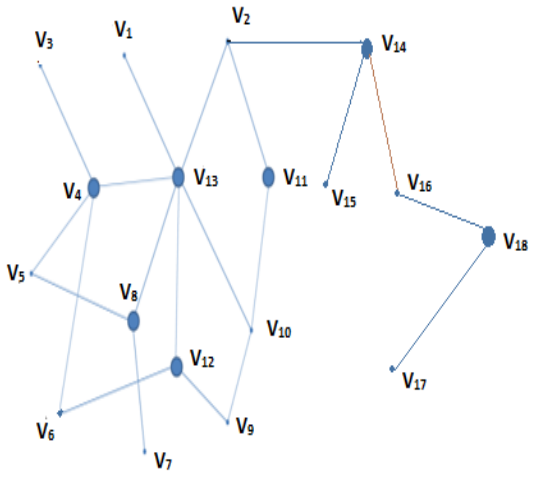
the sets {B,C,E},{D,C} and {B,E,F,G} are Minimal dominating sets

III. SOME APPLICATIONS OF DOMINATION SET

1. School Bus Routing
2. Computer Communication Networks
3. Locate TV and Mobile communication towers
4. Land surveying
5. Assignment Problem

IV. DESCRIPTION OF NETWORK MODEL

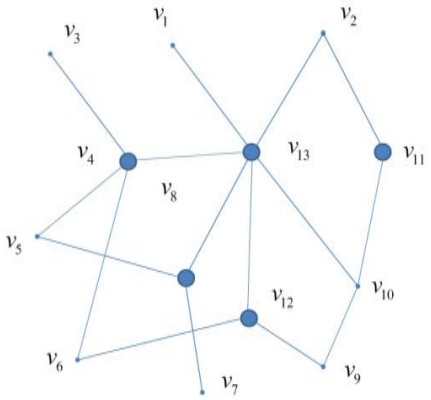
Let 'n' be the vertices of a General graph.
(i.e) n=1,2,3,4,5,6.....
Now, (i) consider n=18.
Let us take a largest area, and we convert that area to be a Graph V. Let us assume that{ v_1,v_2,v_3,v_4.....v_{18}} be the sub areas in V.
Let us show that,we can fix a minimum number of surveillance camera in V
Eg:(i)



(i) Net work Model
Now, Let V={v_1,v_2,.....,v_{18}}

Using domination set, we can find a subset which satisfies a minimum number of domination set.
V={v_1,v_2,v_3,v_4,.....v_{18}}
S_1={$v_1,v_2,v_3,v_4,v_5,v_6,v_{10},v_{18}$}
S_2={$v_1,v_2,v_3,v_5,v_6,v_8,v_{12},v_{14},v_{17}$}
S_3={$v_4,v_8,v_{13},v_{12},v_{11},v_{14},v_{18}$}

(ii) consider n=13
Eg:(ii)



(ii) Net work Model
Now, Let V={v_1,v_2,.....,v_{13}}

Similarly,Using domination set, we can find a subset which satisfies a minimum number of domination set.
V={v_1,v_2,v_3,v_4,.....v_{13}}
S_1={v_1,v_2,v_3,v_4,v_5,v_6}
S_2={$v_1,v_2,v_3,v_5,v_6,v_8,v_{12}$}
S_3={$v_4,v_8,v_{13},v_{12},v_{11}$}

From the Example (i) and (ii), we have many subset S_1,S_2,S_3,etc.,. In these subsets, S_3 satisfies the minimum number of domination set. So, Finally we can fix surveillance in S_3 area and also we can reduce the cost.

V. CONCLUSION

In this paper, by using domination set, the minimum number of surveillance cameras can be fixed and it results in the reduction of cost.

REFERENCES

[1] C. Berge, "Theory of Graphs and its Applications", Methuen, London, (1962).
[2] T.W. Haynes and P. J. Slater, "Paired Domination in graphs", Networks, 32 (1998) 199-206
[3] V. R. Kulli, "Theory of domination in graph",Vishwa Internat.Publications,2010.
[4] T. W. Haynes, S. T. Hedetniemi, and P. J. Slater (eds), "Domination in Graphs: Advanced Topics", Marcel Dekker, Inc. New York, 1 998.
[5] T. W. Haynes, S. T. Hedetniemi, and P. J. Slater (Eds), "Fundamentals of Domination in Graphs", Marcel Dekker, Inc. New York, 1998.