Lucky Edge Labeling of New Graphs

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Abstract — *In this paper ,the Lucky edge labeling of Car graph, Lotus graph, Prism graph, C_{2m} @ P_t , graphs are studied and the Lucky number are also found of these graphs.*

Keywords : — *Lucky Edge Labeling, car graph ,cycle , path,wheel.*

INTRODUCTION

Consider the graphs are simple and undirected graph.For preliminaries of graph theory [1] and study of graph labeling are refered to[3] and definition of lucky edge labelling , lucky number , lucky edge labeled graphs are refered to [2].

DEFINITION:1.1

A graph is obtained from shell graph by adding a vertex in between each pair of adjacent vertices on the cycle and adding an edge in apex and two or more chords is known as Lotus graph.

DEFINITION:1.2

Car graph is obtained from the two wheel graphs and two path graphs.

DEFINITION:1.3

For Prism graph(D_n) the number of vertices is 2n and the number of edges is 3n.

DEFINITION:1.4

Consider the graph C_{2m} * P_t where * stands for the Cartesian product of path on t vertices with an cycle .Obtain a new graph G(t,m,n) by introducing n-pendent edges at each vertex of **the outermost cycle.**

THEOREM :1.1

The Lotus graph is Lucky edge labeling and lucky number of graph $\eta(Lo_n) = 2n+7$.

Proof:

Let us consider,

N can be denoted as a Number of vertices i.e N=(4n+9)

M can be denoted as a number of edges i.e M=(6n+11) and n can be denoted as a pair of petals , where $n \geq 1$.

The vertex labeling are

$$g(a_i) = i \, , 1 \leq i \leq n+1$$

$$g(b_i) = \begin{pmatrix} 2, i = odd \\ 3, i = even \end{pmatrix}$$

The edge labeling are,

$$g(b_1 a_i) = 1+i, 3 \leq i \leq n+2$$

$$g(b_2 a_i) = 2+i, 3 \leq i \leq n+2$$

Hence, the Lotus graph is Lucky edge labelling.

EXAMPLE:

Put n=1:

N can be denoted as a Number of vertices i.e N=(4(1)+9)=13

M can be denoted as a number of edges i.e M=(6(1)+11)=17

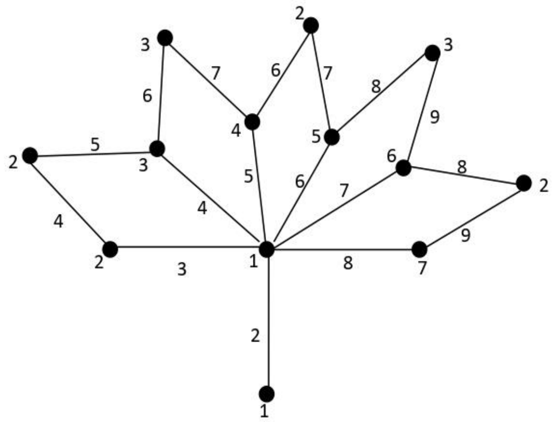
Hence ,The Lucky Number is 2(1)+7=9

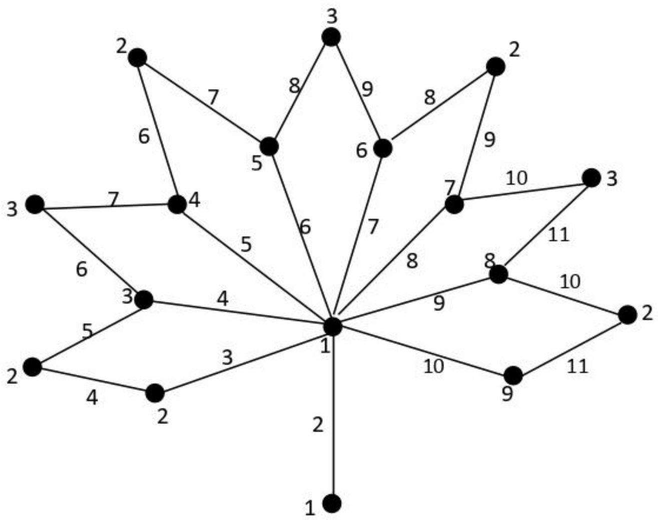
Put n=2:

N can be denoted as a Number of vertices i.e N=(4(2)+9)=17

M can be denoted as a number of edges i.e M=(6(2)+11)=23

Hence ,The Lucky Number is 2(2)+7=11.





THEOREM :1.2

The Car graph is Lucky edge labelling and lucky number of graph $\eta(Dw_n P_m) = 2n-1$ where $n \geq 5, m \geq 8$.

Proof:

Introduce a two path between two wheel graph. The center vertex of two wheel graph be a_1 and b_1 and other vertices are (n-1)cycle.

The vertex of a wheel is joined to path of begin vertex and end with another wheel.Introduce a path between center of the two wheels.

The vertex labelings are

$$g(a_i) = i, i = 1, 2, 3, \ldots$$

$$g(b_i) = i, i = 1, 2, 3, \ldots.$$

$$g(c_i) = \begin{pmatrix} 1, 1 \leq i \leq n-1/2 \\ 2, 1 \leq i \leq n/2 \end{pmatrix}, \begin{pmatrix} 1 \\ 2, 1 \leq i \leq n-1/2, 1 \leq i \leq n/2 \\ 3 \end{pmatrix}$$

Hence, the edge induces a labeling. Hence, the Car graph is Lucky edge labeling.

EXAMPLE:

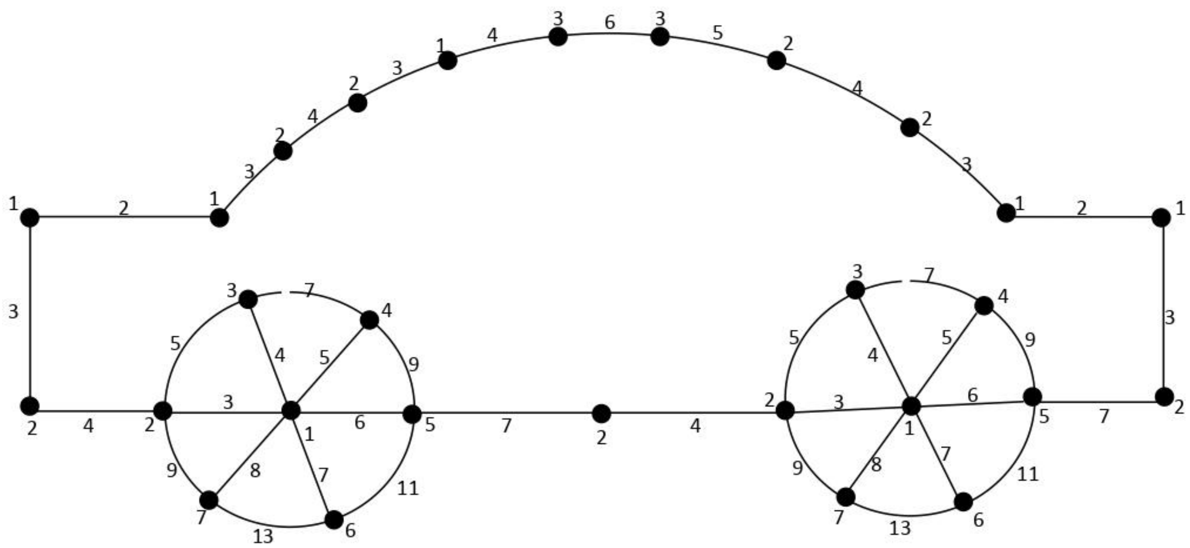
Put n=5, m=9

The vertex labeling are $g(a_i)$=1,2,3,...5

$g(b_i)$=1,2,3,...5

$g(c_n)$=2, $g(c_i)$=1,2,3..[label alternatively]

Hence , the Car graph is Lucky edge labeling and the lucky number is 2(5)-1=9.



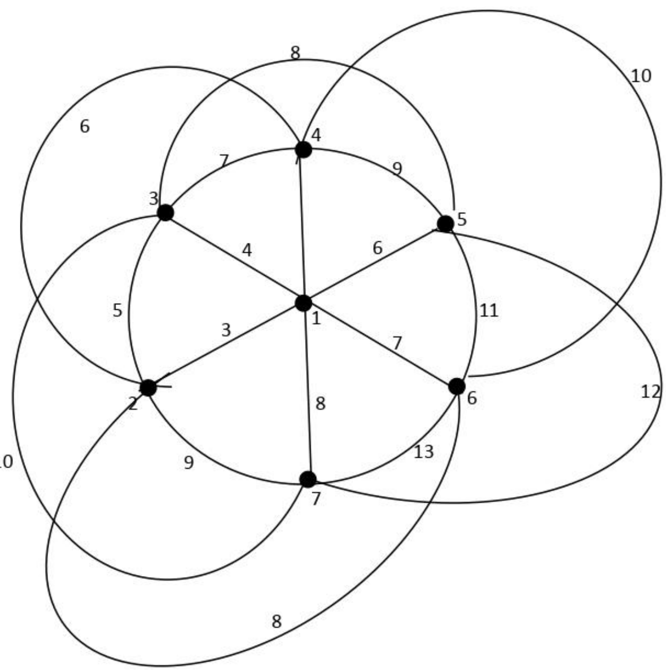
THEOREM:1.3

Rangoli Graph W_n is Lucky edge labeling and the Lucky Number is $\eta(R_n) = 2n-1$.

Proof:

Label the vertices $g(a_i)=i$, (i=1 to n) joined the vertices a_1 to all other vertices $(a_2,a_3,...,a_n)$.Join the vertices $[a_{2i}]$ to $[a_{2i+2}]$ and $[a_{2i+1}]$ to $[a_{2i+3}]$.Hence, the edge induces a Lucky edge labeling.

EXAMPLE:



THEOREM:1.4

Prism Graph D_n is Lucky edge labeling and the Lucky Number is $\eta(D_n) = 4n-1$,where $n \geq 3$

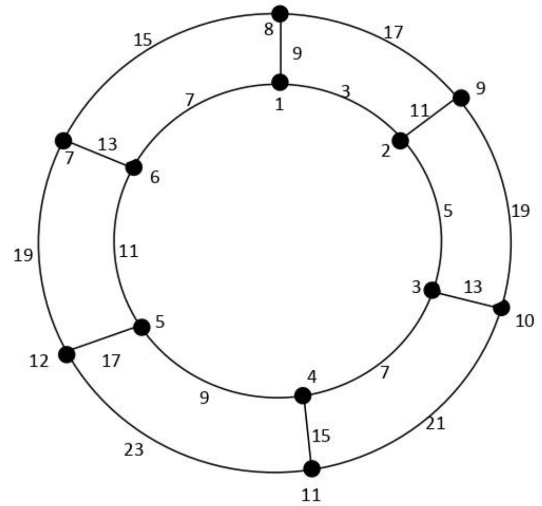
Proof:

The number of vertices of prism graph is 2n and edges is 3n.The vertex labeling is $g(a_1)=1, g(a_{2i})=1+i, g(a_{2i+1})= 2+i$, i=1 to n. This induces a edge labeling. Hence, the prism graph is lucky edge labeling.

EXAMPLE:

Put n=3. The vertex labeling are $g(a_1)=1, g(a_2)=2, \ldots$ The Lucky Number $\eta(D_3)=4(3)-1=11$.

Put n=5. The vertex labeling are $g(a_1)=1, g(a_2)=2, \ldots$ The Lucky Number $\eta(D_5)=4(5)-1=19$. Hence, The Prism graph is Lucky edge labeling.



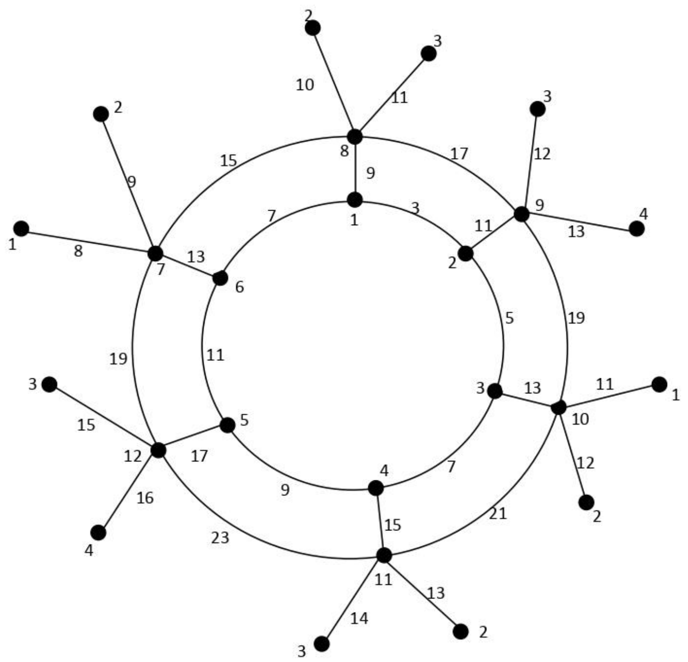
THEOREM:1.5

$C_{2m} * P_t$ is Lucky edge labeling and the Lucky Number is $\eta(C_{2m} * P_t)=4m-1$, t=2

Proof:

Label the vertices of n-cycle is $g(a_i)=i$, i=1 to n .The labeled of path are labeled as the pair of (1,2),(2,3),(3,4) vertices alternatively.The edge induces the labeling.Hence the graph is Lucky edge labeling.

EXAMPLE:



CONCLUSION

In this paper the lucky edge labeling of new graphs namely car graph, lotus graph ,Prism graph are discussed and this can be further studied for various other types of graphs as labeling grows rapidly in its importance of its various applications.

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