Abstract: Let $G$ be a Simple Graph with Vertex set $V(G)$ and Edge set $E(G)$ respectively. Vertex set $V(G)$ is labeled arbitrary by positive integers and let $E(e)$ denote the edge label such that it is the sum of labels of vertices incident with edge $e$. The labeling is said to be lucky edge labeling if the edge set $E(G)$ is a proper coloring of $G$, that is, if we have $E(e_1) \neq E(e_2)$ whenever $e_1$ and $e_2$ are adjacent edges. The least integer $k$ for which a graph $G$ has a lucky edge labeling from the set $\{1, 2, \ldots, k\}$ is the lucky number of $G$ denoted by $\eta(G)$.

A graph which admits lucky edge labeling is the lucky edge labeled graph.

In this paper, it is proved that Path $P_n$, Comb $P_n^+$, Cycle $C_n$, Crown $C_n^+$ are lucky edge labeled graphs.

Keywords: Lucky Edge Labeled Graph, Lucky Edge Labeling, Lucky Number, 2010 Mathematics subject classification Number: 05C78.

1. INTRODUCTION

A graph $G$ is a finite non empty set of objects called vertices together with a set of pairs of distinct vertices of $G$ which is called edges. Each $e=\{uv\}$ of vertices in $E$ is called an edge or a line of $G$. For Graph Theoretical Terminology, [2].

2. PRELIMINARIES

Definition: 2.1

Let $G$ be a Simple Graph with Vertex set $V(G)$ and Edge set $E(G)$ respectively. Vertex set $V(G)$ are labeled arbitrary by positive integers and let $E(e)$ denote the edge label such that it is the sum of labels of vertices incident with edge $e$. The labeling is said to be lucky edge labeling if the edge set $E(G)$ is a proper coloring of $G$, that is, if we have $E(e_1) \neq E(e_2)$ whenever $e_1$ and $e_2$ are adjacent edges. The least integer $k$ for which a graph $G$ has a lucky edge labeling from the set $\{1, 2, \ldots, k\}$ is the lucky number of $G$ denoted by $\eta(G)$.

A graph which admits lucky edge labeling is the lucky edge labeled graph.

Definition: 2.2

A Walk of a graph $G$ is an alternating sequence of vertices and edges $v_1, e_1, v_2, e_2, \ldots, v_{n-1}, e_{n-1}, v_n$ beginning and ending with vertices such that each edge $e_i$ is incident with $v_{i-1}$ and $v_i$.

Definition: 2.3

If all the vertices in a walk are distinct, then it is called a Path and a path of length $n$ is denoted by $P_{n+1}$.

Definition: 2.4

A graph obtained by joining each $u_i$ to a vertex $v_i$ is called a Comb and denoted by $P_n^+$. The vertex set and Edge set of $P_n^+$ is $V[P_n^+] = \{u_i, v_i: 1 \leq i \leq n\}$ and $E[P_n^+] = \{(u_i, u_{i+1}): 1 \leq i \leq n-1\} \cup \{(u_i, v_i): 1 \leq i \leq n\}$ respectively. $P_n^+$ has $2n$ vertices and $2n-1$ edges.

Definition: 2.5

A closed path is called a Cycle and a cycle of length $n$ is denoted by $C_n$. 

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Definition: 2.6

$C_n^+$ is a graph obtained from $G$ by attaching a pendent vertex from each vertex of the graph $C_n$ is called Crown.

3. MAIN RESULTS

Theorem: 3.1

$P_n$ has $\{a, b\}$ lucky edge labeling graph for any $a, b \in N$.

Proof:

Let $V[P_n] = \{ u_i : 1 \leq i \leq n \}$ and $E[P_n] = \{ (u_i, u_{i+1}) : 1 \leq i \leq n-1 \}$.

Let $f: V[P_n] \to \{1, 2\}$ defined by

\[
f(u_{2i}) = \begin{cases} 
1 & i \equiv 1 \mod 2 \\
2 & i \equiv 0 \mod 2 
\end{cases}
\]

and $1 \leq i \leq (n - 1)/2$, for $n$ is odd and $1 \leq i \leq n/2$, for $n$ is even.

\[
f(u_{2i-1}) = \begin{cases} 
1 & i \equiv 1 \mod 2 \\
2 & i \equiv 0 \mod 2 
\end{cases}
\]

and $1 \leq i \leq (n + 1)/2$, for $n$ is odd and $1 \leq i \leq n/2$, for $n$ is even.

Then the induced edge coloring are

whenn is odd, $1 \leq i \leq (n - 1)/2$ and when $n$ is even, $1 \leq i \leq (n/2) - 1$

\[
f^*(u_2u_{2i+1}) = 3
\]

whenn is odd, $1 \leq i \leq (n - 1)/2$ and when $n$ is even, $1 \leq i \leq n/2$

\[
f^*(u_{2i-1}u_{2i}) = \begin{cases} 
2 & i \equiv 1 \mod 2 \\
4 & i \equiv 0 \mod 2 
\end{cases}
\]

It is clear that lucky edge labeling of $P_n$ is $\{2, 3, 4\}$.

Hence, $P_n$ has lucky edge labeling graph.

For example, lucky edge labeling of $P_6$ is shown in figure 1 and $\eta(P_6) = 4$.

\[\begin{array}{cccccc}
1 & 2 & 1 & 3 & 2 & 4 \\
\rightarrow & \rightarrow & \rightarrow & \rightarrow & \rightarrow & \rightarrow \\
\end{array}\]

Theorem: 3.2

$P_n^+$ has $\{a, b, c\}$ lucky edge labeling graph for any $a, b, c \in N$.

Proof:

Let $V[P_n^+] = \{ \{u_i : 1 \leq i \leq n\}, \{v_i : 1 \leq i \leq n\}\}$ and $E[P_n^+] = \{(u_i, u_{i+1}) : 1 \leq i \leq n-1\} \cup \{(u_i, v_i) : 1 \leq i \leq n\}$.

Let $f: V[P_n^+] \to \{1, 2, 3\}$ defined by

\[
f(u_{2i}) = \begin{cases} 
1 & i \equiv 1 \mod 2 \\
2 & i \equiv 0 \mod 2 
\end{cases}
\]

and $1 \leq i \leq (n - 1)/2$, for $n$ is odd and $1 \leq i \leq n/2$, for $n$ is even.

\[
f(u_{2i-1}) = \begin{cases} 
1 & i \equiv 1 \mod 2 \\
2 & i \equiv 0 \mod 2 
\end{cases}
\]

and $1 \leq i \leq (n + 1)/2$, for $n$ is odd and $1 \leq i \leq n/2$, for $n$ is even.
Lucky Edge Labeling of $P_n$, $C_n$ and Corona of $P^+_n$, $C^+_n$

$$f(v_i) = 2$$
$$f(v_i) = 3, \ 2 \leq i \leq n-1$$
$$f(v_n) = \begin{cases} 1 & n \equiv 0, 1 \ mod \ 4 \\ 2 & n \equiv 2, 3 \ mod \ 4 \end{cases}$$

Then the induced edge coloring are

when $n$ is odd, $1 \leq i \leq (n-1)/2$ and when $n$ is even, $1 \leq i \leq (n/2) - 1$

$$f'_{(u_2u_{2i+1})} = 3$$

when $n$ is odd, $1 \leq i \leq (n-1)/2$ and when $n$ is even, $1 \leq i \leq n/2$

$$f'(u_{2i,u_{2i+2}}) = \begin{cases} 2 & i \equiv 1 \ mod \ 2 \\ 4 & i \equiv 0 \ mod \ 2 \end{cases}$$

$$f'(u_1v_1) = 3$$

$$f'(u_iv_i) = \begin{cases} 4 & i \equiv 1, 2 \ mod \ 4 \\ 5 & i \equiv 0, 3 \ mod \ 4 \end{cases} \ for \ 2 \leq i \leq n-1.$$

$$f'(u_nv_n) = \begin{cases} 3 & n \equiv 0 \ mod \ 2 \\ 2 & n \equiv 1 \ mod \ 4 \\ 4 & n \equiv 3 \ mod \ 4 \end{cases}$$

It is clear that lucky edge labeling of $P^+_n$ is $\{2, 3, 4, 5\}$.

Hence, $P^+_n$ has lucky edge labeling graph.

For example, lucky edge labeling of $P^+_5$ and $P^+_6$ are given in the figure 2a and figure 2b and $\eta(P^+_n) = 5$.

![Figure 2a and $\eta(P^+_5) = 5$](image)

![Figure 2b and $\eta(P^+_6) = 5$](image)

**Theorem 3.3:**

$C_n : n \equiv 1, 2, 3 \ mod \ 4$ has $\{a, b, c\}$ lucky edge labeling and

$C_n : n \equiv 0 \ mod \ 4$ has $\{a, b\}$ lucky edge labeling for any $a, b, c \in \mathbb{N}$. 
Proof:
Let \( V[C_n] = \{ u_i : 1 \leq i \leq n \} \) and \( E[C_n] = \{ (u_i, u_{i+1}) : 1 \leq i \leq n-1 \} \cup \{(u_n, u_1)\} \).

Case 1:
Let \( C_n \) be the graph when \( n \equiv 0 \pmod{4} \).
Let \( f: V[C_n] \to \{1, 2\} \) defined by
\[
f(u_{2i}) = \begin{cases} 1 & i \equiv 1 \pmod{2} \, 1 \leq i \leq n/2. \\ 2 & i \equiv 0 \pmod{2} \, 1 \leq i \leq n/2. 
\end{cases}
\]
\[
f(u_{2i-1}) = \begin{cases} 1 & i \equiv 1 \pmod{2} \\ 2 & i \equiv 0 \pmod{2} \, 1 \leq i \leq n/2. 
\end{cases}
\]
Then the induced edge coloring are
when \( 1 \leq i \leq (n/2) - 1 \),
\[
f^\ast(u_{2i}u_{2i+1}) = 3,
\]
\[
f^\ast(u_{2i}u_{2i+1}) = 3.
\]
when \( 1 \leq i \leq n/2 \),
\[
f^\ast(u_{2i}u_{2i+1}) = \begin{cases} 2 & i \equiv 1 \pmod{2} \\ 4 & i \equiv 0 \pmod{2} 
\end{cases}
\]
It is clear that the lucky edge labeling of \( C_n : n \equiv 0 \pmod{4} \) is \{2, 3, 4\}.
For example, Lucky edge labeling of \( C_4 \) is given in the figure 3a and \( \eta(C_n) = 4 \).

Case 2:
Let \( C_n \) be the graph when \( n \equiv 1 \pmod{4} \).
Let \( f: V[C_n] \to \{1, 2, 3\} \) defined by
\[
f(u_{2i}) = \begin{cases} 1 & i \equiv 1 \pmod{2} \, 1 \leq i \leq n/2. \\ 2 & i \equiv 0 \pmod{2} \, 1 \leq i \leq n/2. 
\end{cases}
\]
\[
f(u_{2i-1}) = \begin{cases} 1 & i \equiv 1 \pmod{2} \\ 2 & i \equiv 0 \pmod{2} \, 1 \leq i \leq n/2. 
\end{cases}
\]
\[
f(u_i) = 3, i \equiv 1 \pmod{4} \text{ and } i = n.
\]
Then the induced edge coloring are
when \( 1 \leq i \leq (n - 3)/2 \),
\[
f^\ast(u_{2i}u_{2i+1}) = 3,
\]
when \( 1 \leq i \leq (n - 1)/2 \),
\[
f^\ast(u_{2i}u_{2i+1}) = \begin{cases} 2 & i \equiv 1 \pmod{2} \\ 4 & i \equiv 0 \pmod{2} 
\end{cases}
\]
when \( i=n \),
\[
f^\ast(u_{i}u_{i-1}) = 4 \text{ and } f^\ast(u_{i}u_{i}) = 5.
\]
It is clear that the lucky edge labeling of \( C_n : n \equiv 1 \pmod{4} \) is clearly \{2, 3, 4, 5\}.
For example, Lucky edge labeling of \( C_5 \) is shown in the figure 3b and \( \eta(C_n) = 5 \).

**Figure 3a** and \( \eta(C_n) = 4 \)  **Figure 3b** and \( \eta(C_n) = 5 \)
Lucky Edge Labeling of \( P_n \), \( C_n \) and Corona of \( P_n \), \( C_n \)

**Case 3:**
Let \( C_n \) be the graph when \( n \equiv 2 \) (mod 4). Let \( f: V[C_n] \rightarrow \{1, 2, 3\} \) defined by

\[
\begin{align*}
    f(u_{2i}) &= \begin{cases} 
        1 & i \equiv 1 \text{ mod } 2 \\
        2 & i \equiv 0 \text{ mod } 2
    \end{cases}, 
    1 \leq i \leq (n/2) - 1, \\
    f(u_{2i-1}) &= \begin{cases} 
        1 & i \equiv 1 \text{ mod } 2 \\
        2 & i \equiv 0 \text{ mod } 2
    \end{cases}, 
    1 \leq i \leq (n/2) - 1, \\
    f(u_i) &= \begin{cases} 
        3 & i \equiv 1 \text{ (mod } 4) \\
        2 & i \equiv 2 \text{ (mod } 4)
    \end{cases} \text{ and } i = n, n-1.
\end{align*}
\]

Figure 3c and \( \eta(C_n) = 6 \)

Then the induced edge coloring are
when \( 1 \leq i \leq (n/2) - 2, \)
\( f^*(u_{2i}u_{2i+1}) = 3. \)
when \( 1 \leq i \leq (n/2) - 1, \)
\( f^*(u_{2i-1}u_{2i}) = \begin{cases} 
    2 & i \equiv 1 \text{ mod } 2 \\
    4 & i \equiv 0 \text{ mod } 2
\end{cases}. \)
when \( i = n-1 \) and \( n-2, \)
\( f^*(u_{i}u_{i+1}) = \begin{cases} 
    5 & i \equiv 0 \text{ mod } 4 \\
    6 & i \equiv 1 \text{ mod } 4
\end{cases}. \)
\( f^*(u_{n}u_{1}) = 4. \)

It is clear that the lucky edge labeling of \( C_n : n \equiv 2 \) (mod 4) is clearly \{2, 3, 4, 5, 6\}. For example, Lucky edge labeling of \( C_6 \) is shown in the figure 3c and \( \eta(C_n) = 6 \).

**Case 4:**
Let \( C_n \) be the graph when \( n \equiv 3 \) (mod 4). Let \( f: V[C_n] \rightarrow \{1, 2, 3\} \) defined by

\[
\begin{align*}
    f(u_{2i}) &= \begin{cases} 
        1 & i \equiv 1 \text{ mod } 2 \\
        2 & i \equiv 0 \text{ mod } 2
    \end{cases}, 
    1 \leq i \leq (n-3)/2, \\
    f(u_{2i-1}) &= \begin{cases} 
        1 & i \equiv 1 \text{ mod } 2 \\
        2 & i \equiv 0 \text{ mod } 2
    \end{cases}, 
    1 \leq i \leq (n+1)/2 \text{ and } i = n-1, \\
    f(u_i) &= 3, i \equiv 2 \text{ (mod } 4). \)
\end{align*}
\]

Then the induced edge coloring is
when \( 1 \leq i \leq (n-3)/2, \)
\( f^*(u_{2i}u_{2i+1}) = 3. \)
when \( 1 \leq i \leq (n-3)/2, \)
\( f^*(u_{2i-1}u_{2i}) = \begin{cases} 
    2 & i \equiv 1 \text{ mod } 2 \\
    4 & i \equiv 0 \text{ mod } 2
\end{cases}. \)
\( f^*(u_iu_{i+1}) = \begin{cases} 
    4 \text{ when } t = n-1 \text{ and } f^*(u_{n}u_{1}) = 3.
\end{cases}. \)

\[
\begin{align*}
    \text{Figure 3d and } \eta(C_n) &= 5
\end{align*}
\]
It is clear that the lucky edge labeling of $C_n : n \equiv 3 \pmod{4}$ is clearly $\{2, 3, 4, 5\}$. For example, Lucky edge labeling of $C_7$ is shown in the figure 3d and $\eta(C_7) = 5$. Hence, $C_n$ has lucky edge labeling graph.

**Theorem 3.4:**

$C_n^* : n \equiv 0, 1, 2, 3 \pmod{4}$ has $\{a, b, c\}$ lucky edge labeling for any $a, b, c \in \mathbb{N}$.

**Proof:**

Let $V[C_n^*] = \{u_i : 1 \leq i \leq n\}$ and $\{v_i : 1 \leq i \leq n\}$ and 

$E[C_n^*] = \{(u_i, u_{i+1}) : 1 \leq i \leq n-1\} \cup \{(u_1, u_n)\} \cup \{(u_i, v_i) : 1 \leq i \leq n\}$.

Case 1:

Let $C_n^*$ be the graph when $n \equiv 0 \pmod{4}$.

Let $f : V[C_n] \to \{1, 2, 3\}$ defined by

\[
\begin{align*}
  f(u_{2i}) &= \begin{cases} 
    1 & i \equiv 1 \pmod{2} \\
    2 & i \equiv 0 \pmod{2} 
  \end{cases}, 1 \leq i \leq n/2.
\end{align*}
\]

\[
\begin{align*}
  f(u_{2i-1}) &= \begin{cases} 
    1 & i \equiv 1 \pmod{2} \\
    2 & i \equiv 0 \pmod{2} 
  \end{cases}, 1 \leq i \leq n/2.
\end{align*}
\]

\[
f(v_i) = 3, 1 \leq i \leq n.
\]

Then the induced edge coloring are

when $1 \leq i \leq (n/2) - 1$,

\[
\begin{align*}
  f^*(u_{2i}u_{2i+1}) &= 3. \\
  f^*(u_{2i-1}u_{2i}) &= 3.
\end{align*}
\]

when $1 \leq i \leq n/2$,

\[
\begin{align*}
  f^*(u_{2i+1}u_{2i}) &= \begin{cases} 
    2 & i \equiv 1 \pmod{2} \\
    4 & i \equiv 0 \pmod{2} 
  \end{cases}.
\end{align*}
\]

when $1 \leq i \leq n$,

\[
\begin{align*}
  f^*(u_i, v_i) &= \begin{cases} 
    4 & i \equiv 1, 2 \pmod{4} \\
    5 & i \equiv 0, 3 \pmod{4}
  \end{cases}.
\end{align*}
\]

It is clear that the lucky edge labeling of $C_n^* : n \equiv 0 \pmod{4}$ is $\{2, 3, 4, 5\}$.

For example, Lucky edge labeling of $C_4^*$ is shown in the figure 4a and $\eta(C_n^*) = 5$.

Case 2:

Let $C_n^*$ be the graph when $n = 1 \pmod{4}$.

Let $f : V[C_n] \to \{1, 2, 3\}$ defined by

\[
\begin{align*}
  f(u_{2i}) &= \begin{cases} 
    1 & i \equiv 1 \pmod{2} \\
    2 & i \equiv 0 \pmod{2} 
  \end{cases}, 1 \leq i \leq n/2.
\end{align*}
\]

\[
\begin{align*}
  f(u_{2i-1}) &= \begin{cases} 
    1 & i \equiv 1 \pmod{2} \\
    2 & i \equiv 0 \pmod{2} 
  \end{cases}, 1 \leq i \leq n/2.
\end{align*}
\]

\[
f(u_n) = 3, i \equiv 1 \pmod{4} \text{ and } i = n.
\]

\[
f(v_1) = 2, f(v_{n-1}) = 1
\]

\[
f(v_i) = 3, 2 \leq i \leq n.
\]

Then the induced edge coloring are

when $1 \leq i \leq (n - 3)/2$,

\[
\begin{align*}
  f^*(u_{2i}u_{2i+1}) &= 3.
\end{align*}
\]

when $1 \leq i \leq (n - 1)/2$,

\[
\begin{align*}
  f^*(u_{2i+1}u_{2i}) &= \begin{cases} 
    2 & i \equiv 1 \pmod{2} \\
    4 & i \equiv 0 \pmod{2}
  \end{cases}.
\end{align*}
\]

when $i = n$,

\[
\begin{align*}
  f^*(u_i, v_i) &= 4 \text{ and } f^*(u_i, u_1) = 5.
\end{align*}
\]
Lucky Edge Labeling of $P_n$, $C_n$ and Corona of $P_n$, $C_n$

when $2 \leq i \leq n$,

$$f^*(u_i, v_i) = \begin{cases} 
5 & i \equiv 3 \mod 4 \\
3 & i \equiv 0 \mod 4 \\
6 & i \equiv 1 \mod 4 
\end{cases}$$

when $2 \leq i \leq n-3$,

$$f^*(u_i, v_i) = \begin{cases} 
4 & i \equiv 1, 2 \mod 4 \\
5 & i \equiv 0, 3 \mod 4 
\end{cases}$$

It is clear that the lucky edge labeling of $C_n^+: n \equiv 1 \mod 4$ is $\{2, 3, 4, 5, 6\}$.
For example, Lucky edge labeling of $C_5^+$ is shown in the figure 4b and $\eta(C_5^+) = 6$.

Case 3:

Let $C_n^+$ be the graph when $n \equiv 2 \mod 4$.

Let $f: V[C_n^+] \rightarrow \{1, 2, 3\}$ defined by

$$f(u_{2i}) = \begin{cases} 
1 & i \equiv 1 \mod 2 \\
2 & i \equiv 0 \mod 2 
\end{cases} \quad 1 \leq i \leq (n/2) - 1.$$  

$$f(u_{2i-1}) = \begin{cases} 
1 & i \equiv 1 \mod 2 \\
2 & i \equiv 0 \mod 2 
\end{cases} \quad 1 \leq i \leq (n/2) - 1.$$  

$$f(v_i) = 3, \quad i = n - 1, n-2 \text{ and } f(v_i) = 2, i = 1, n.$$  

Then the induced edge coloring are

when $1 \leq i \leq (n/2) - 2$,

$$f^*(u_{2i}u_{2i+1}) = 3.$$  

when $1 \leq i \leq (n/2) - 1$,

$$f^*(u_{2i-1}u_{2i}) = \begin{cases} 
2 & i \equiv 1 \mod 2 \\
4 & i \equiv 0 \mod 2 
\end{cases}.$$  

when $i = n-1, n-2$,

$$f^*(u_{i+1}u_i) = \begin{cases} 
5 & i \equiv 0 \mod 4 \\
6 & i \equiv 1 \mod 4 
\end{cases}.$$  

$$f^*(u_{n-1}u_1) = 4.$$  

when $i = 1, n-2$,

$$f^*(u_{n-1}v_1) = 3.$$  

when $2 \leq i \leq n-1$,

$$f^*(u_{i}v_{i+1}) = \begin{cases} 
4 & i \equiv 1, 2 \mod 4 \\
5 & i \equiv 0, 3 \mod 4 
\end{cases}.$$  

$$f^*(u_{n-1}v_1) = 5, i = n.$$  

It is clear that the lucky edge labeling of $C_n^+: n \equiv 2 \mod 4$ is $\{2, 3, 4, 5, 6\}$.
For example, Lucky edge labeling of $C_6^+$ is shown in the figure 4c and $\eta(C_6^+) = 6$.

Case 4:

Let $C_n^+$ be the graph when $n \equiv 3 \mod 4$.

Let $f: V[C_n^+] \rightarrow \{1, 2, 3\}$ defined by

$$f(u_{2i}) = \begin{cases} 
1 & i \equiv 1 \mod 2 \\
2 & i \equiv 0 \mod 2 
\end{cases} \quad 1 \leq i \leq (n - 3)/2.$$  

$$f(u_{2i-1}) = \begin{cases} 
1 & i \equiv 1 \mod 2 \\
2 & i \equiv 0 \mod 2 
\end{cases} \quad 1 \leq i \leq (n + 1)/2 \quad \text{and } i = n-1.$$  

$$f(u_{n+1}) = 2 \pmod{4}.$$  

$$f(v_i) = \begin{cases} 
2 & i \equiv 3 \mod 4 \\
3 & i \equiv 2 \mod 4, n-2 \leq i \leq n \\
1 & i \equiv 1 \mod 4 
\end{cases}.$$  

$$f(v_i) = 3, 1 \leq i \leq n-3.$$
Then the induced edge coloring are

when $1 \leq i \leq (n-3)/2$,

$f^*(u_{2i}u_{2i+1}) = 3$.

when $1 \leq i \leq (n-3)/2$,

$f^*(u_{2i-1}u_{2i}) = \begin{cases} 2 & i \equiv 1 \text{ mod } 2 \\ 4 & i \equiv 0 \text{ mod } 2 \end{cases}$,

$f^*(u_{i-1}u_i) = \begin{cases} 4 & \text{when } i = n-1 \\ 5 & \text{when } i = 1 \end{cases}$,

$f^*(u_{n}u_1) = 3$.

when $-2 \leq i \leq n$,

$f^*(u_iv_i) = \begin{cases} 2 & i \equiv 1 \text{ mod } 3 \\ 6 & i \equiv 2 \text{ mod } 3 \\ 4 & i \equiv 0 \text{ mod } 3 \end{cases}$.

when $1 \leq i \leq n-3$,

$f^*(u_iv_i) = \begin{cases} 4 & i \equiv 1, 2 \text{ mod } 4 \\ 5 & i \equiv 0, 3 \text{ mod } 4 \end{cases}$.
Lucky Edge Labeling of $P_n$, $C_n$ and Corona of $P_n$, $C_n$

It is clear that the lucky edge labeling of $C_n^+ : n \equiv 3 \pmod{4}$ is $\{2, 3, 4, 5, 6\}$.

For example, Lucky edge labeling of $C_7^+$ is shown in the figure 4d and $\eta(C_n^+) = 6$.

Hence, $C_n^+$ has lucky edge labeling graph.

4. CONCLUSION

Among all labelling lucky edge labelling has a special importance because it is incorporated with coloring of graphs

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