The Gracefulness of the Merging Graph N ** C_4 with Dotnet Framework

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Abstract:

There are many graceful graph from standers path, circuit, wheel etc .In this paper a new class of graceful graphs related to c_4 [circuits with 4 vertices] is obtained .

Keyword: - path limit, 'n' - copies of c_4

I. Introduction:

Most graph labeling methods trace their origin to one introduced by Rosa [2] or one given Graham and Sloane [1]. Rosa defined a function f, a β-valuation of a graph with q edges if f is an injective map from the vertices of G to the set {0, 1, 2 ,…,q} such that when each edge xy is assigned the label $|f(x)-f(y)|$, the resulting edge labels are distinct.

A. Solairaju and K. Chitra [3] first introduced the concept of edge-odd graceful labeling of graphs, and edge-odd graceful graphs.

A. Solairaju and others [5,6,7,8,9] proved the results that(1) the Gracefulness of a spanning tree of the graph of Cartesian product of P_m and C_n,was obtained (2) the Gracefulness of a spanning tree of the graph of cartesian product of S_m and S_n, was obtained (3) edge-odd Gracefulness of a spanning tree of Cartesian product of P_2 and C_n was obtained (4) Even - edge Gracefulness of the Graphs was obtained (5) ladder P_2 x P_n is even-edge graceful, and (6) the even-edge gracefulness of P_n o nC_5 is obtained.(8) Gracefulness of Tp-tree with five levels obtained by java programming,(9) Gracefulness of $^nc_4$ Merging with paths,(10) A new class of graceful trees and (11) Gracefulness of $P_K \circ 2_{c_k}$, is obtained. (12, 13, 14) Used for dot net framework 3.5.

Section I: Preliminaries

Definition 1.1:

Let G = (V,E) be a simple graph with p vertices and q edges.

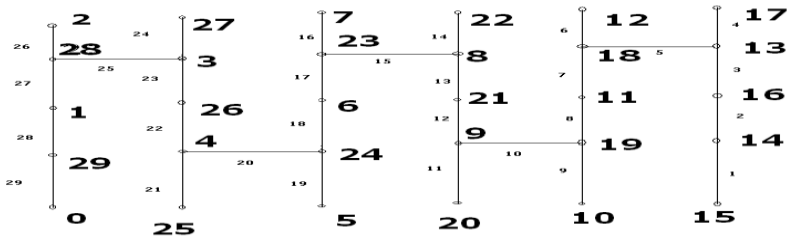
A map f :V(G) → {0,1,2,…,q} is called a graceful labeling if

(i) f is one – to – one

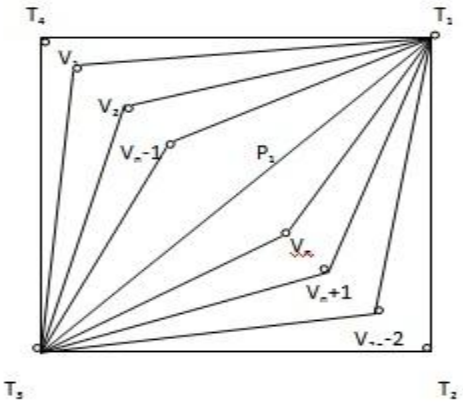
(ii) The edges receive all the labels (numbers) from 1 to q where the label of an edge is the absolute value of the difference between the vertex labels at its ends.

A graph having a graceful labeling is called a graceful graph.

Example 1.1: The graph 6 Δ P_5 is a graceful graph.



Theorem: The gracefulness of the merging graph n ** c_4 generalization:



P_2 = Path of length 1,

N = Number of square.

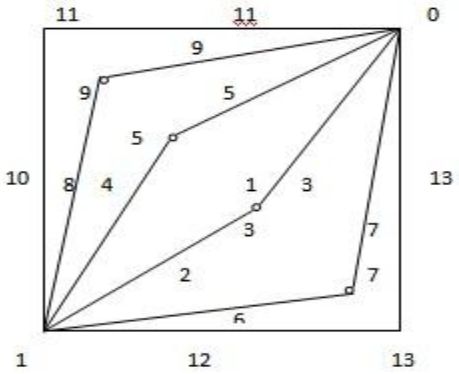
C_4 = Cycle of 4 vertices

q = Number of edges

f (T_1) = 0,
f (T_2) = q,
f (T_3) = 1,
f (T_4) = q-2
f (v_1) = q - 4
f (v_n) = 3.

$$f(v_i) = \begin{cases} f(vi-1)-4, & for \quad i = 2,3,\ldots\ldots(n-1), \\ f(vi-1)+4, & for \quad i = n+1, n+2, \ldots 2(n-1) \end{cases}$$

Example 1.1 :



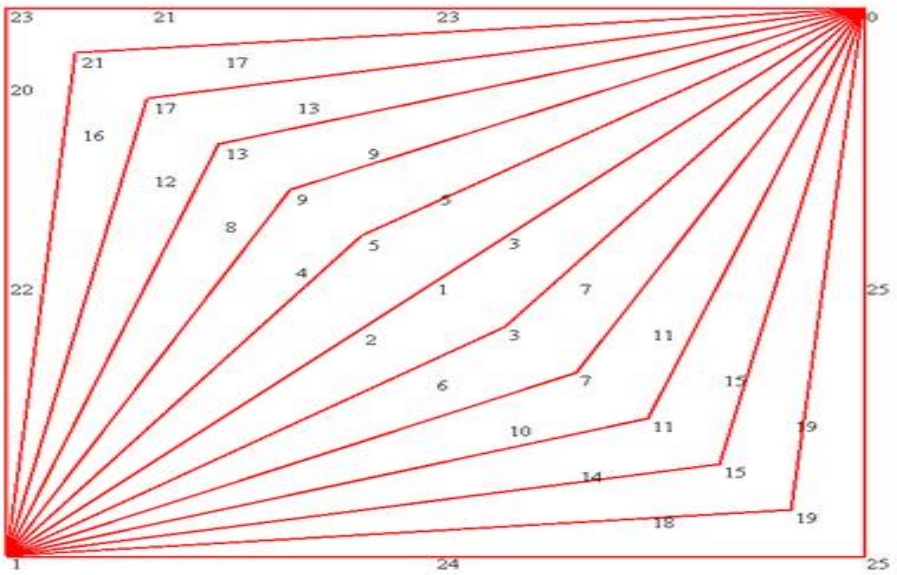
Algorithm for THE GRACEFULNESS OF THE MERGING GRAPH n ** C4 in Dotnet Language

```
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Windows.Forms;
```

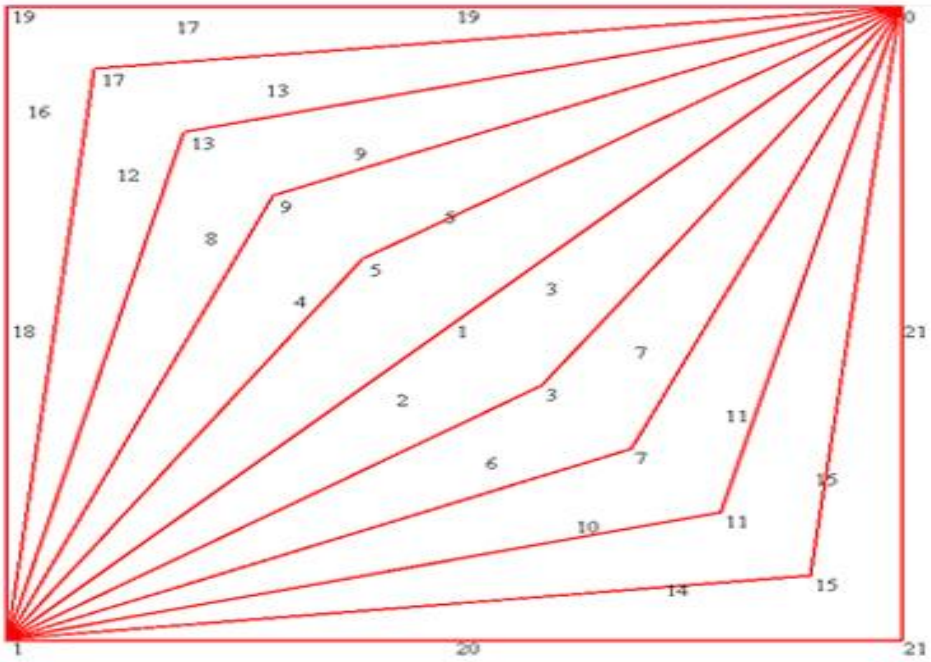
```
namespace Class
{
   public partial class Form1 : Form
   {
      public Form1()
      {
         InitializeComponent();
      }
      int StartX = 5;
      int StartY = 5;
      int Width = 500;
      int Height = 500;
      private void btnLine_Click(object sender, EventArgs e)
      {
         // Declare edges and center point
         int edges =Convert.ToInt32( textBox1.Text);
         int center = Width / 2;
         int newedge = (1 + 4 * edges);
         label2.Text = "No of Edges :" + newedge.ToString();
         // Set Graphics Tool
         Graphics g;
         g = this.CreateGraphics();
         g.Clear(Color.White);
         SolidBrush myBrush = new SolidBrush(Color.Black);
         Font font = new Font("Times New Roman", 12.0f);
         Pen myPen = new Pen(Color.Red);
         myPen.Width = 2;

         // Draw center line and Rectangle
         g.DrawLine(myPen, Width, StartX, StartY, Height);
         g.DrawRectangle(myPen, StartX, StartY, Width, Height);
         //draw Inner Rectangle lines
         int nval = (center / edges);
          int sample=center;
          int sample1 = center;
         for (int i = 0; i < edges-1; i++)
         {
            sample = sample + nval;
            sample1 = sample1 - nval;

            g.DrawLine(myPen, sample, sample, StartY, Height);
            g.DrawLine(myPen, Width, StartX, sample, sample);

            g.DrawLine(myPen, sample1, sample1, StartY, Height);
            g.DrawLine(myPen, Width, StartX, sample1, sample1);

         }

        // Find Edges Values
         int q = (1+4*Convert.ToInt32(textBox1.Text));
         int T1 = 0;
         int T2 = q;
         int T3 = 1;
         int T4 = q - 2;
         int P1 = 1;
```

```
            g.DrawString(T1.ToString(), font, myBrush, Width, StartY);
            g.DrawString(T2.ToString(), font, myBrush, Height, Width);
            g.DrawString(T3.ToString(), font, myBrush, StartX, Width);
            g.DrawString(T4.ToString(), font, myBrush, StartX, StartY);
            g.DrawString(P1.ToString(), font, myBrush, center, center);
            g.DrawString(Convert.ToString(T4 - T1), font, myBrush, Width - center, StartY);
            g.DrawString(Convert.ToString(T2 - T1), font, myBrush, Height, Width - center);
            g.DrawString(Convert.ToString(T2 - T3), font, myBrush, Height - center, Width);
            g.DrawString(Convert.ToString(T4 - T3), font, myBrush, StartX, Width - center);
            int v1 = q - 4;
            int vn = 3;
            int incrementvalue = center / edges;
            int addsub = 0;
            int diff = 300;
            for (int j = 0; j < edges-1; j++)
            {
               addsub = addsub + incrementvalue;
               g.DrawString(vn.ToString(), font, myBrush, center+addsub, center+addsub);
                g.DrawString(Convert.ToString(vn - T3), font, myBrush, center +(addsub-100), center +addsub);
               g.DrawString(Convert.ToString(vn - T1), font, myBrush, center+addsub, center +(addsub-100));
               g.DrawString(v1.ToString(), font, myBrush, StartX + addsub, StartY + addsub);
               g.DrawString(Convert.ToString(v1 - T3), font, myBrush, StartY +(addsub-60),StartY+addsub+10);
              g.DrawString(Convert.ToString(v1 - T1), font, myBrush, StartX+addsub+10, StartX+(addsub-60));
               v1 = v1 - 4;
               vn = vn + 4;
            }


        }


    }
}
```

Example 1 : n is Even (n=6) :



Example 2 : n is Odd (n=5)



References:

[1]. R. L. Graham and N. J. A. Sloane, On additive bases and harmonious graph, SIAM J. Alg. Discrete Math., 1 (1980) 382 – 404.

[2]. A. Rosa, On certain valuation of the vertices of a graph, Theory of graphs (International

[3]. Synposium,Rome,July 1966),Gordon and Breach, N.Y.and Dunod Paris (1967), 349-355.

[4]. A.Solairaju and K.Chitra Edge-odd graceful labeling of some graphs, Electronics Notes in Discrete Mathematics Volume 33,April 2009,Pages 1.

[5]. A. Solairaju and P.Muruganantham, even-edge gracefulness of ladder, The Global Journal of Applied Mathematics & Mathematical Sciences(GJ-AMMS). Vol.1.No.2, (July-December-2008):pp.149-153.

[6]. A. Solairaju and P.Sarangapani, even-edge gracefulness of P_n o nC_5, Preprint (Accepted for publication in Serials Publishers, New Delhi).

[7]. A.Solairaju, A.Sasikala, C.Vimala Gracefulness of a spanning tree of the graph of product of P_m and C_n, The **Global Journal** of Pure and Applied Mathematics of Mathematical Sciences, Vol. 1, No-2 (July-Dec 2008): pp 133-136.

[8]. A. Solairaju, C.Vimala,A.Sasikala Gracefulness of a spanning tree of the graph of Cartesian product of S_m and S_n, The **Global Journal** of Pure and Applied Mathematics of Mathematical Sciences, Vol. 1, No-2 (July-Dec 2008): pp117-120.

[9]. A. Solairaju, N.Abdul ali , s. Abdul saleem Gracefulness of Tp-tree with five levels obtained by java programming, The International Journel of Scientific and Research Publication (IJSRP), Volume 2,Issue 12,December 2012 Edition [ISSN 2250 – 3153]

[10]. A. Solairaju, N.Abdul ali, Gracefulness of $^{n}c_4$ Merging with paths, International Organization of Scientific Research (IOSR),Volume 4,Issue 4, 20 December 2012.Paper ID:G22078

[11]. A. Solairaju, N.Abdul ali, A new class of gracefull trees. International journal of science & engineering research (IJSER),Volume 4,1st dec 2013.paper ID : I01653

[12]. A. Solairaju, N.Abdul ali, Gracefull ness of $P_K \circ 2_{c_k}$, International Journal of Engineering Research and Technology(IJERT),Volume 1,Issue :10th dec 2012,Paper ID :P12552 [ISSN 2278 – 0181]

[13]. Tbuan thai & hoang Q.Lan,".Net Framework Essentials",O`reilly,2nd Edition 2007.

[14]. D.Nikhil Kothari,",.Net Framework",Addison-Wesley Professional,2008.

[15]. Christian Nagel et al,"Programming in C#",Wrox Publication,2001