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RESEARCH ARTICLE

TRUTH TABLE - SMARANDACHLEY PRODUCT CORDIAL LABELING OF BLOOM TORUS GRAPH BTm,n

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Abstract

In this paper the researcher prepares truth table for the labeling of Bloom Torus graph $BT_{m,n}$ by admitting the condition of Smarandachely product cordial labelling. Smarandachely product cordial labeling on G is such a labeling $f : V(G) \longrightarrow \{0,1\}$ with induced labeling $f(u)\, f(v) on\ edge\ uv \in E(G)$ $that \left|v_f(0) - v_f(1)\right| \geq 2 \quad and \left|e_f(0) - e_f(1)\right| \geq 2.$

Introduction:-

A graph labeling is an assignment of integers to the vertices or edges or both, subject to certain conditions. Labeling helps to distinguish between any two adjacent vertices or edges. Graph labelling was first introduced in the year 1967 by Rosa [1]. Rosa defined a function as $f : V(G) \to \{0,1,2,3.....q\}$, f is an injection such that, when each edge xy is assigned the label $|f(x) - f(y)|$, the resulting edge labels are distinct.

D.Antony Xavier and Deeni C.J [2] worked on bloom graph. It possesss a unique properly of being both regular and planar. D. Antony Xavier, Deeni C.J [2] introduced about a new interconnection network motivated by the grid, cylinder and torus network.Bloom torus: A potential fixed interconnection architecture was introduced by S. Kulandai Therese, D. Antony and Andrew Arokiaraj [3]. L (2, 1)-Labelling for Bloom graph was introduced by Chriranlal Kujur, D.Antony Xavier, Arul Amritha Raja and Francis Xavier [4].

Now the researcher is going to work on a different kind of graph which is known as Bloom Torus graph. Graphs can be used to model interconnection networks in which vertices correspond to processors of the network and the edges correspond to communication links. A new interconnection network topology which is called the bloom Torus graph has been introduced by truth table, which satisfies the condition of SmaranDachley Product Cordial labelling.

Definition- Bloom Torus Graph $BT_{m,n}$ The bloom torus denoted by $BT(m,n); m,n > 2 consists\ of\ vertex\ set$

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$V(BT(m,n)=\{(x,y): 0 \le x \le m-1, 0 \le y \le n-1$, two distinct vertices being adjacent if and only if (x_1, y_1) and (x_2, y_2)

1) $x_1 = 0, x_2 = m-1$ and $y_2 = (y_1 - 1 + \left\lfloor \frac{m}{2} \right\rfloor (\mathrm{mod} n))$

2) $x_1 = 0, x_2 = m-1$ and $y_2 = (y_1 + \left\lfloor \frac{m}{2} \right\rfloor (\mathrm{mod} n))$

3) $x_2 = x_1 + 1$ and $y_1 = y_2$

4) $x_2 = x_1 + 1$ and $y_1 + 1 \equiv y_2 (\mathrm{mod}\ n)$

The first and second conditions describe the wrap-around edges, the third condition describes the vertical edges and fourth condition describes the slant edges. Bloomtorus graph has mn vertices and 2mn edges

The vertex connectivity and the edge connectivity of bloom graph is 4. Bloom graph is plannar, tripartite and 4-regular.

Truth Table for Labeling of Bloom Torus Graph $BT_{m,n}$ -

Theorem 1 – *The* $m \times n$ dimensional *BloomTorus graph* $BT_{m,n}$ *admits Smarandachely* Product *Cordial labeling* $m, n \ge 3$.

Case 1:- When m,n both are even-

$BT_{m,n}$	V(0)	V(1)	$\lvert\sum v(0) - \sum v(1)\rvert \ge 2$	e(0)	e(1)	$\lvert\sum e(0) - \sum e(1)\rvert \ge 2$
$BT_{4,4}$	6	10	4	24	8	16
$BT_{4,6}$	8	16	8	32	16	16
$BT_{4,8}$	10	22	12	40	24	16
$BT_{4,10}$	12	28	16	48	32	16
$BT_{4,12}$	14	34	20	56	40	16
$BT_{4,14}$	16	40	24	64	48	16
$BT_{4,16}$	18	46	28	72	56	16
$BT_{4,18}$	20	52	32	80	64	16
$BT_{4,20}$	22	58	36	88	72	16
$BT_{4,22}$	24	64	40	96	80	16
$BT_{4,24}$	26	70	44	104	88	16
$BT_{4,26}$	28	76	48	112	96	16
$BT_{4,28}$	30	82	52	120	104	16
$BT_{4,30}$	32	88	56	128	112	16
$BT_{4,32}$	34	94	60	136	120	16
$BT_{4,34}$	36	100	64	144	128	16
$BT_{4,36}$	38	106	68	152	136	16
$BT_{4,38}$	40	112	72	160	144	16
$BT_{4,40}$	42	118	76	168	152	16
$BT_{4,42}$	44	124	80	176	160	16
$BT_{4,44}$	46	130	84	184	168	16
$BT_{4,46}$	48	136	88	192	176	16
$BT_{4,48}$	50	142	92	200	184	16
$BT_{4,50}$	52	148	96	208	192	16

So on…..

$BT_{m,n}$	V(0)	V(1)	$\lvert\sum v(0) - \sum v(1)\rvert \ge 2$	e(0)	e(1)	$\lvert\sum e(0) - \sum e(1)\rvert \ge 2$
$BT_{6,4}$	9	15	6	36	12	24
$BT_{6,6}$	12	24	12	48	24	24

$BT_{6,8}$	15	33	18	60	36	24
$BT_{6,10}$	18	42	24	72	48	24
$BT_{6,12}$	21	51	30	84	60	24
$BT_{6,14}$	24	60	36	96	72	24
$BT_{6,16}$	27	69	42	108	84	24
$BT_{6,18}$	30	78	48	120	96	24
$BT_{6,20}$	33	87	54	132	108	24
$BT_{6,22}$	36	96	60	144	120	24
$BT_{6,24}$	39	105	66	156	132	24
$BT_{6,26}$	42	114	72	168	144	24
$BT_{6,28}$	45	123	78	180	156	24
$BT_{6,30}$	48	132	84	192	168	24
$BT_{6,32}$	51	141	90	204	180	24
$BT_{6,34}$	54	150	96	216	192	24
$BT_{6,36}$	57	159	102	228	204	24
$BT_{6,38}$	60	168	108	240	216	24
$BT_{6,40}$	63	177	114	252	228	24
$BT_{6,42}$	66	186	120	264	240	24
$BT_{6,44}$	69	195	126	276	252	24
$BT_{6,46}$	72	204	132	288	264	24
$BT_{6,48}$	75	213	138	300	276	24
$BT_{6,50}$	78	222	144	312	288	24

So on……..

BTm, n	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{8,4}$	12	20	8	48	16	32
$BT_{8,6}$	16	32	16	64	32	32
$BT_{8,8}$	20	44	24	80	48	32
$BT_{8,10}$	24	56	32	96	64	32
$BT_{8,12}$	28	68	40	112	80	32
$BT_{8,14}$	32	80	48	128	96	32
$BT_{8,16}$	36	92	56	144	112	32
$BT_{8,18}$	40	104	64	160	128	32
$BT_{8,20}$	44	116	72	176	144	32
$BT_{8,22}$	48	128	80	192	160	32
$BT_{8,24}$	52	140	88	208	176	32
$BT_{8,26}$	56	152	96	224	192	32
$BT_{8,28}$	60	164	104	240	208	32
$BT_{8,30}$	64	176	112	256	224	32
$BT_{8,32}$	68	188	120	272	240	32
$BT_{8,34}$	72	200	128	288	256	32
$BT_{8,36}$	76	212	136	304	272	32
$BT_{8,38}$	80	224	144	320	288	32
$BT_{8,40}$	84	236	152	336	304	32
$BT_{8,42}$	88	248	160	352	320	32
$BT_{8,44}$	92	260	168	368	336	32
$BT_{8,46}$	96	272	176	384	352	32
$BT_{8,48}$	100	290	190	400	368	32
$BT_{8,50}$	104	302	198	416	384	32

So on……..

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{10,4}$	15	25	10	60	20	40
$BT_{10,6}$	20	40	20	80	40	40
$BT_{10,8}$	25	55	30	100	60	40

$BT_{10,10}$	30	70	40	120	80	40
$BT_{10,12}$	35	85	50	140	100	40
$BT_{10,14}$	40	100	60	160	120	40
$BT_{10,16}$	45	115	70	180	140	40
$BT_{10,18}$	50	130	80	200	160	40
$BT_{10,20}$	55	145	90	220	180	40
$BT_{10,22}$	60	160	100	240	200	40
$BT_{10,24}$	65	175	110	260	220	40
$BT_{10,26}$	70	190	120	280	240	40
$BT_{10,28}$	75	205	130	300	260	40
$BT_{10,30}$	80	220	140	320	280	40
$BT_{10,32}$	85	235	150	340	300	40
$BT_{10,34}$	90	250	160	360	320	40
$BT_{10,36}$	95	265	170	380	340	40
$BT_{10,38}$	100	280	180	400	360	40
$BT_{10,40}$	105	295	190	420	380	40
$BT_{10,42}$	110	310	200	440	400	40
$BT_{10,44}$	115	325	210	460	420	40
$BT_{10,46}$	120	340	220	480	440	40
$BT_{10,48}$	125	355	230	500	460	40
$BT_{10,50}$	130	370	240	520	480	40

So on……

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{12,4}$	18	30	12	72	24	48
$BT_{12,6}$	24	48	24	96	48	48
$BT_{12,8}$	30	66	36	120	72	48
$BT_{12,10}$	36	84	48	144	96	48
$BT_{12,12}$	42	102	60	168	120	48
$BT_{12,14}$	48	120	72	192	144	48
$BT_{12,16}$	54	138	84	216	168	48
$BT_{12,18}$	60	156	96	240	192	48
$BT_{12,20}$	66	174	108	264	216	48
$BT_{12,22}$	72	192	120	288	240	48
$BT_{12,24}$	78	210	132	312	264	48
$BT_{12,26}$	84	228	144	336	288	48
$BT_{12,28}$	90	246	156	360	312	48
$BT_{12,30}$	96	264	168	384	336	48
$BT_{12,32}$	102	282	180	408	360	48
$BT_{12,34}$	108	300	192	432	384	48
$BT_{12,36}$	114	318	204	456	408	48
$BT_{12,38}$	120	336	216	480	432	48
$BT_{12,40}$	126	354	228	504	456	48
$BT_{12,42}$	132	372	240	528	480	48
$BT_{12,44}$	138	390	252	552	504	48
$BT_{12,46}$	144	408	264	576	528	48
$BT_{12,48}$	150	426	276	600	552	48
$BT_{12,50}$	162	444	282	624	576	48

So on……

Case 2:- when m is odd, n is even-

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{3,4}$	2	10	8	8	16	8
$BT_{3,6}$	3	15	12	12	24	12

$BT_{3,8}$	4	20	16	16	32	16
$BT_{3,10}$	5	25	20	20	40	20
$BT_{3,12}$	6	30	24	24	48	24
$BT_{3,14}$	7	35	28	28	56	28
$BT_{3,16}$	8	40	32	32	64	32
$BT_{3,18}$	9	45	36	36	72	36
$BT_{3,20}$	10	50	40	40	80	40
$BT_{3,22}$	11	55	44	44	88	44
$BT_{3,24}$	12	60	48	48	96	48
$BT_{3,26}$	13	65	52	52	104	52
$BT_{3,28}$	14	70	56	56	112	56
$BT_{3,30}$	15	75	60	60	120	60
$BT_{3,32}$	16	80	64	64	128	64
$BT_{3,34}$	17	85	68	68	136	68
$BT_{3,36}$	18	90	72	72	144	72
$BT_{3,38}$	19	95	76	76	152	76
$BT_{3,40}$	20	100	80	80	160	80
$BT_{3,42}$	21	105	84	84	168	84
$BT_{3,44}$	22	110	88	88	176	88
$BT_{3,46}$	23	115	92	92	184	92
$BT_{3,48}$	24	120	96	96	192	96
$BT_{3,50}$	25	125	100	100	200	100

So on……..

$BT_{m,n}$	V(0)	V(1)	$\left\|\sum v(0) - \sum v(1)\right\| \geq 2$	e(0)	e(1)	$\left\|\sum e(0) - \sum e(1)\right\| \geq 2$
$BT_{5,4}$	4	16	12	16	24	8
$BT_{5,6}$	6	24	18	24	36	12
$BT_{5,8}$	8	32	24	32	48	16
$BT_{5,10}$	10	40	30	40	60	20
$BT_{5.12}$	12	48	36	48	72	24
$BT_{5,14}$	14	56	42	56	84	28
$BT_{5,16}$	16	64	48	64	96	32
$BT_{5,18}$	18	72	54	72	108	36
$BT_{5,20}$	20	80	60	80	120	40
$BT_{5,22}$	22	88	66	88	132	44
$BT_{5,24}$	24	96	72	96	144	48
$BT_{5,26}$	26	104	78	104	156	52
$BT_{5,28}$	28	112	84	112	168	56
$BT_{5,30}$	30	120	90	120	180	60
$BT_{5,32}$	32	128	96	128	192	64
$BT_{5,34}$	34	136	102	136	204	68
$BT_{5,36}$	36	144	108	144	216	72
$BT_{5,38}$	38	152	114	152	228	76
$BT_{5,40}$	40	160	120	160	240	80
$BT_{5,42}$	42	168	126	168	252	84
$BT_{5,44}$	44	176	132	176	264	88
$BT_{5,46}$	46	184	138	184	276	92
$BT_{5,48}$	48	192	144	192	288	96
$BT_{5,50}$	50	200	150	200	300	100

So on……

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{7,4}$	6	22	16	24	32	8
$BT_{7,6}$	9	33	24	36	48	12
$BT_{7,8}$	12	44	32	48	64	16
$BT_{7,10}$	15	55	40	60	80	20
$BT_{7,12}$	18	66	48	72	96	24
$BT_{7,14}$	21	77	56	84	112	28
$BT_{7,16}$	24	88	64	96	128	32
$BT_{7,18}$	27	99	72	108	144	36
$BT_{7,20}$	30	110	80	120	160	40
$BT_{7,22}$	33	121	88	132	176	44
$BT_{7,24}$	36	132	96	144	192	48
$BT_{7,26}$	39	143	104	156	208	52
$BT_{7,28}$	42	154	112	168	224	56
$BT_{7,30}$	45	165	120	180	240	60
$BT_{7,32}$	48	176	128	192	256	64
$BT_{7,34}$	51	187	136	204	272	68
$BT_{7,36}$	54	198	144	216	288	72
$BT_{7,38}$	57	209	152	228	304	76
$BT_{7,40}$	60	220	160	240	320	80
$BT_{7,42}$	63	231	168	252	336	84
$BT_{7,44}$	66	242	176	264	352	88
$BT_{7,46}$	69	253	184	276	368	92
$BT_{7,48}$	72	264	192	288	384	96
$BT_{7,50}$	75	275	200	300	400	100

So on……..

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{9,4}$	8	28	20	32	40	8
$BT_{9,6}$	12	42	30	48	60	12
$BT_{9,8}$	16	56	40	64	80	16
$BT_{9,10}$	20	70	50	80	100	20
$BT_{9,12}$	24	84	60	96	120	24
$BT_{9,14}$	28	98	70	112	140	28
$BT_{9,16}$	32	112	80	128	160	32
$BT_{9,18}$	36	126	90	144	180	36
$BT_{9,20}$	40	140	100	160	200	40
$BT_{9,22}$	44	154	110	176	220	44
$BT_{9,24}$	48	168	120	192	240	48
$BT_{9,26}$	52	182	130	208	260	52
$BT_{9,28}$	56	196	140	224	280	56
$BT_{9,30}$	60	210	150	240	300	60
$BT_{9,32}$	64	224	160	256	320	64
$BT_{9,34}$	68	238	170	272	340	68
$BT_{9,36}$	72	252	180	288	360	72
$BT_{7,38}$	76	266	190	304	380	76
$BT_{9,40}$	80	280	200	320	400	80
$BT_{9,42}$	84	294	210	336	420	84
$BT_{9,44}$	88	308	220	352	440	88
$BT_{9,46}$	92	322	230	368	460	92
$BT_{9,48}$	96	336	240	384	480	96

$BT_{9,50}$	100	350	250	400	500	100

So on…..

$BT_{m,n}$	V(0)	V(1)	$\left\|\sum v(0) - \sum v(1)\right\| \geq 2$	e(0)	e(1)	$\left\|\sum e(0) - \sum e(1)\right\| \geq 2$
$BT_{11,4}$	10	34	24	40	48	8
$BT_{11,6}$	15	51	36	60	72	12
$BT_{11,8}$	20	68	48	80	96	16
$BT_{11,10}$	25	85	60	100	120	20
$BT_{11.12}$	30	102	72	120	144	24
$BT_{11,14}$	35	119	84	140	168	28
$BT_{11,16}$	40	136	96	160	192	32
$BT_{11,18}$	45	153	108	180	216	36
$BT_{11,20}$	50	170	120	200	240	40
$BT_{11,22}$	55	187	132	220	264	44
$BT_{11,24}$	60	204	144	240	288	48
$BT_{11,26}$	65	221	156	260	312	52
$BT_{11,28}$	70	238	168	280	336	56
$BT_{11,30}$	75	255	180	300	360	60
$BT_{11,32}$	80	272	192	320	384	64
$BT_{11,34}$	85	289	204	340	408	68
$BT_{11,36}$	90	306	216	360	432	72
$BT_{11,38}$	95	323	228	380	456	76
$BT_{11,40}$	100	340	240	400	480	80
$BT_{11,42}$	105	357	252	420	504	84
$BT_{11,44}$	110	374	264	440	528	88
$BT_{11,46}$	115	391	276	460	552	92
$BT_{11,48}$	120	408	288	480	576	96
$BT_{11,50}$	125	425	300	500	600	100

So on……..

$BT_{m,n}$	V(0)	V(1)	$\left\|\sum v(0) - \sum v(1)\right\| \geq 2$	e(0)	e(1)	$\left\|\sum e(0) - \sum e(1)\right\| \geq 2$
$BT_{13,4}$	12	40	28	48	56	8
$BT_{13,6}$	18	60	42	72	84	12
$BT_{13,8}$	24	80	56	96	112	16
$BT_{13,10}$	30	100	70	120	140	20
$BT_{13.12}$	36	120	84	144	168	24
$BT_{13,14}$	42	140	98	168	196	28
$BT_{13,16}$	48	160	112	192	224	32
$BT_{13,18}$	54	180	126	216	252	36
$BT_{13,20}$	60	200	140	240	280	40
$BT_{13,22}$	66	220	154	264	308	44
$BT_{13,24}$	72	240	168	288	336	48
$BT_{13,26}$	78	260	182	312	364	52
$BT_{13,28}$	84	280	196	336	392	56
$BT_{13,30}$	90	300	210	360	420	60
$BT_{13,32}$	96	320	224	384	448	64
$BT_{13,34}$	102	340	238	408	476	68
$BT_{13,36}$	108	360	252	432	504	72
$BT_{13,38}$	114	380	266	456	532	76
$BT_{13,40}$	120	400	280	480	560	80
$BT_{13,42}$	126	420	294	504	588	84
$BT_{13,44}$	132	440	308	528	616	88
$BT_{13,46}$	138	460	322	552	644	92

$BT_{13,48}$	144	480	336	576	672	96
$BT_{13,50}$	150	500	350	600	700	100

Soon……

Case 3:- When m is even, n in odd –

$BT_{m,n}$	V(0)	V(1)	$\left\|\sum v(0) - \sum v(1)\right\| \geq 2$	e(0)	e(1)	$\left\|\sum e(0) - \sum e(1)\right\| \geq 2$
$BT_{4,5}$	4	16	12	16	24	8
$BT_{4,7}$	6	22	16	24	32	8
$BT_{4,9}$	8	28	20	32	40	8
$BT_{4.11}$	10	34	24	40	48	8
$BT_{4,13}$	12	40	28	48	56	8
$BT_{4,15}$	14	46	32	56	64	8
$BT_{4,17}$	16	52	36	64	72	8
$BT_{4,19}$	18	58	40	72	80	8
$BT_{4,21}$	20	64	44	80	88	8
$BT_{4,23}$	22	70	48	88	96	8
$BT_{4,25}$	24	76	52	96	104	8
$BT_{4,27}$	26	82	56	104	112	8
$BT_{4,29}$	28	88	60	112	120	8
$BT_{4,31}$	30	94	64	120	128	8
$BT_{4,33}$	32	100	68	128	136	8
$BT_{4,35}$	34	106	72	136	144	8
$BT_{4,37}$	36	112	76	144	152	8
$BT_{4,39}$	38	118	80	152	160	8
$BT_{4,41}$	40	124	84	160	168	8
$BT_{4,43}$	42	130	88	168	176	8
$BT_{4,45}$	44	136	92	176	184	8
$BT_{4,47}$	46	142	96	184	192	8
$BT_{4,49}$	48	148	100	192	200	8
$BT_{4,51}$	50	154	104	200	208	8

So on……..

$BT_{m,n}$	V(0)	V(1)	$\left\|\sum v(0) - \sum v(1)\right\| \geq 2$	e(0)	e(1)	$\left\|\sum e(0) - \sum e(1)\right\| \geq 2$
$BT_{6,5}$	6	24	18	36	24	12
$BT_{6,7}$	9	33	24	48	36	12
$BT_{6,9}$	12	42	30	60	48	12
$BT_{6.11}$	15	51	36	72	60	12
$BT_{6,13}$	18	60	42	84	72	12
$BT_{6,15}$	21	69	48	96	84	12
$BT_{6,17}$	24	78	54	108	96	12
$BT_{6,19}$	27	87	60	120	108	12
$BT_{6,21}$	30	96	66	132	120	12
$BT_{6,23}$	33	105	72	144	132	12
$BT_{6,25}$	36	114	78	156	144	12
$BT_{6,27}$	39	123	84	168	156	12
$BT_{6,29}$	42	132	90	180	168	12
$BT_{6,31}$	45	141	96	192	180	12
$BT_{6,33}$	48	150	102	204	192	12
$BT_{6,35}$	51	159	108	216	204	12
$BT_{6,37}$	54	168	114	228	216	12

$BT_{6,39}$	57	177	120	240	228	12
$BT_{6,41}$	60	186	126	252	240	12
$BT_{6,43}$	63	195	132	264	252	12
$BT_{6,45}$	66	204	138	276	264	12
$BT_{6,47}$	69	213	144	288	276	12
$BT_{6,49}$	72	222	150	300	288	12
$BT_{6,51}$	75	231	156	312	300	12

So on……..

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{8,5}$	8	32	24	32	48	16
$BT_{8,7}$	12	44	32	48	64	16
$BT_{8,9}$	16	56	40	64	80	16
$BT_{8.11}$	20	68	48	80	96	16
$BT_{8,13}$	24	80	56	96	112	16
$BT_{8,15}$	28	92	64	112	128	16
$BT_{8,17}$	32	104	72	128	144	16
$BT_{8,19}$	36	116	80	144	160	16
$BT_{8,21}$	40	128	88	160	176	16
$BT_{8,23}$	44	140	96	176	192	16
$BT_{8,25}$	48	152	104	192	208	16
$BT_{8,27}$	52	164	112	208	224	16
$BT_{8,29}$	56	176	120	224	240	16
$BT_{8,31}$	60	188	128	240	256	16
$BT_{8,33}$	64	200	136	256	272	16
$BT_{8,35}$	68	212	144	272	288	16
$BT_{8,37}$	72	224	152	288	304	16
$BT_{8,39}$	76	236	160	304	320	16
$BT_{8,41}$	80	248	168	320	336	16
$BT_{8,43}$	84	260	176	336	352	16
$BT_{8,45}$	88	272	184	352	368	16
$BT_{8,47}$	92	284	192	368	384	16
$BT_{8,49}$	96	296	200	384	400	16
$BT_{8,51}$	100	308	208	400	416	16

So on…….

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{10,5}$	10	40	30	40	60	20
$BT_{10,7}$	15	55	40	60	80	20
$BT_{10,9}$	20	70	50	80	100	20
$BT_{10,11}$	25	85	60	100	120	20
$BT_{10,13}$	30	100	70	120	140	20
$BT_{10,15}$	35	115	80	140	160	20
$BT_{10,17}$	40	130	90	160	180	20
$BT_{10,19}$	45	145	100	180	200	20
$BT_{10,21}$	50	160	110	200	220	20
$BT_{10,23}$	55	175	120	220	240	20
$BT_{10,25}$	60	190	130	240	260	20
$BT_{10,27}$	65	205	140	260	280	20
$BT_{10,29}$	70	220	150	280	300	20
$BT_{10,31}$	75	235	160	300	320	20

$BT_{10,33}$	80	250	170	320	340	20
$BT_{10,35}$	85	265	180	340	360	20
$BT_{10,37}$	90	280	190	360	380	20
$BT_{10,39}$	95	295	200	380	400	20
$BT_{10,41}$	100	310	210	400	420	20
$BT_{10,43}$	105	325	220	420	440	20
$BT_{10,45}$	110	340	230	440	460	20
$BT_{10,47}$	115	355	240	460	480	20
$BT_{10,49}$	120	370	250	480	500	20
$BT_{10,51}$	125	385	260	500	520	20

So on……..

$BT_{m,n}$	V(0)	V(1)	$\left\|\sum v(0) - \sum v(1)\right\| \geq 2$	e(0)	e(1)	$\left\|\sum e(0) - \sum e(1)\right\| \geq 2$
$BT_{12,3}$	12	48	36	48	72	24
$BT_{12,5}$	18	66	48	72	96	24
$BT_{12,7}$	24	84	60	96	120	24
$BT_{12,9}$	30	102	72	120	144	24
$BT_{12,11}$	36	120	84	144	168	24
$BT_{12,13}$	42	138	96	168	192	24
$BT_{12,15}$	48	156	108	192	216	24
$BT_{12,17}$	54	174	120	216	240	24
$BT_{12,19}$	60	192	132	240	264	24
$BT_{12,21}$	66	210	144	264	288	24
$BT_{12,23}$	72	228	156	288	312	24
$BT_{12,25}$	78	246	168	312	336	24
$BT_{12,27}$	84	264	180	336	360	24
$BT_{12,29}$	90	282	192	360	384	24
$BT_{12,31}$	96	300	204	384	408	24
$BT_{12,33}$	102	318	216	408	432	24
$BT_{12,35}$	108	336	228	432	456	24
$BT_{12,37}$	114	354	240	456	480	24
$BT_{12,39}$	120	372	252	480	504	24
$BT_{12,41}$	126	390	264	504	528	24
$BT_{12,43}$	132	408	276	528	552	24
$BT_{12,45}$	138	426	288	552	576	24
$BT_{12,47}$	144	444	300	576	600	24
$BT_{12,49}$	150	462	312	600	624	24
$BT_{12,51}$	156	480	324	624	648	24

So on……

Case 4:- When m, n both are odd -

$BT_{m,n}$	V(0)	V(1)	$\left\|\sum v(0) - \sum v(1)\right\| \geq 2$	e(0)	e(1)	$\left\|\sum e(0) - \sum e(1)\right\| \geq 2$
$BT_{3,5}$	3	12	9	12	18	6
$BT_{3,7}$	4	17	13	16	26	10
$BT_{3,9}$	5	22	17	20	34	14
$BT_{3.11}$	6	27	21	24	42	18
$BT_{3,13}$	7	32	25	28	50	22
$BT_{3,15}$	8	37	29	32	58	26
$BT_{3,17}$	9	42	33	36	66	30
$BT_{3,19}$	10	47	37	40	74	34

$BT_{3,21}$	11	52	41	44	82	38
$BT_{3,23}$	12	57	45	48	90	42
$BT_{3,25}$	13	62	49	52	98	46
$BT_{3,27}$	14	67	53	56	106	50
$BT_{3,29}$	15	72	57	60	114	54
$BT_{3,31}$	16	77	61	64	122	58
$BT_{3,33}$	17	82	65	68	130	62
$BT_{3,35}$	18	87	69	72	138	66
$BT_{3,37}$	19	92	73	76	146	70
$BT_{3,39}$	20	97	77	80	154	74
$BT_{3,41}$	21	102	81	84	162	78
$BT_{3,43}$	22	107	85	88	170	82
$BT_{3,45}$	23	112	89	92	178	86
$BT_{3,47}$	24	117	93	96	186	90
$BT_{3,49}$	25	122	97	100	194	94
$BT_{3,51}$	26	127	101	104	202	98

So on……

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{5,5}$	6	19	13	24	26	2
$BT_{5,7}$	8	27	19	32	38	6
$BT_{5,9}$	10	35	25	40	50	10
$BT_{5,11}$	12	43	31	48	62	14
$BT_{5,13}$	14	51	37	56	74	18
$BT_{5,15}$	16	59	43	64	86	22
$BT_{5,17}$	18	67	49	72	98	26
$BT_{5,19}$	20	75	55	80	110	30
$BT_{5,21}$	22	83	61	88	122	34
$BT_{5,23}$	24	91	67	96	134	38
$BT_{5,25}$	26	99	73	104	146	42
$BT_{5,27}$	28	107	79	112	158	46
$BT_{5,29}$	30	115	85	120	170	50
$BT_{5,31}$	32	123	91	128	182	54
$BT_{5,33}$	34	131	97	136	194	58
$BT_{5,35}$	36	139	103	144	206	62
$BT_{5,37}$	38	147	109	152	218	66
$BT_{5,39}$	40	155	115	160	230	70
$BT_{5,41}$	42	163	121	168	242	74
$BT_{5,43}$	44	171	127	176	254	78
$BT_{5,45}$	46	179	133	184	266	82
$BT_{5,47}$	48	187	139	192	278	86
$BT_{5,49}$	50	195	145	200	290	90
$BT_{5,51}$	52	103	51	208	302	94

So on……

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{7,5}$	9	26	17	36	34	2
$BT_{7,7}$	12	37	25	48	50	2
$BT_{7,9}$	15	48	33	60	66	6
$BT_{7,11}$	18	59	41	72	82	10
$BT_{7,13}$	21	70	49	84	98	14
$BT_{7,15}$	24	81	57	96	114	18
$BT_{7,17}$	27	92	65	108	130	22

$BT_{7,19}$	30	103	73	120	146	26
$BT_{7,21}$	33	114	81	132	162	30
$BT_{7,23}$	36	125	89	144	178	34
$BT_{7,25}$	39	136	97	156	194	38
$BT_{7,27}$	42	147	105	168	210	42
$BT_{7,29}$	45	158	113	180	226	46
$BT_{7,31}$	48	169	121	192	242	50
$BT_{7,33}$	51	180	129	204	258	54
$BT_{7,35}$	54	191	137	216	274	58
$BT_{7,37}$	57	202	145	228	290	62
$BT_{7,39}$	60	213	153	240	306	66
$BT_{7,41}$	63	224	161	252	322	70
B $T_{7,43}$	66	235	169	264	338	74
$BT_{7,45}$	69	246	177	276	354	78
$BT_{7,47}$	72	257	185	288	370	82
$BT_{7,49}$	75	268	193	300	386	86
$BT_{7,51}$	78	279	201	312	402	90

So on……

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{9,5}$	12	33	21	48	42	6
$BT_{9,7}$	16	47	31	64	62	2
$BT_{9,9}$	20	61	41	80	82	2
$BT_{9,11}$	24	75	51	96	102	6
$BT_{9,13}$	28	89	61	112	122	10
$BT_{9,15}$	32	103	71	128	142	14
$BT_{9,17}$	36	117	81	144	162	18
$BT_{9,19}$	40	131	91	160	182	22
BT $_{9,21}$	44	145	101	176	202	26
$BT_{9,23}$	48	159	111	192	222	30
$BT_{9,25}$	52	173	121	208	242	34
$BT_{9,27}$	56	187	131	224	262	38
$BT_{9,29}$	60	201	141	240	282	42
$BT_{9,31}$	64	215	151	256	302	46
$BT_{9,33}$	68	229	161	272	322	50
$BT_{9,35}$	72	243	171	288	342	54
$BT_{9,37}$	76	257	181	304	362	58
$BT_{9,39}$	80	271	191	320	382	62
$BT_{9,41}$	84	285	201	336	402	66
$BT_{9,43}$	88	299	211	352	422	70
$BT_{9,45}$	92	313	221	368	442	74
$BT_{9,47}$	96	327	231	384	462	78
$BT_{9,49}$	100	341	241	400	482	82
$BT_{9,51}$	104	355	251	416	502	86

So on.....

$BT_{m,n}$	V(0)	V(1)	$\left\lvert\sum v(0)-\sum v(1)\right\rvert \geq 2$	e(0)	e(1)	$\left\lvert\sum e(0)-\sum e(1)\right\rvert \geq 2$
$BT_{11,5}$	15	40	25	60	50	10
$BT_{11,7}$	20	57	37	80	74	6
$BT_{11,9}$	25	74	49	100	98	2
$BT_{11,11}$	30	91	61	120	122	2
$BT_{11,13}$	35	108	73	140	146	6
$BT_{11,15}$	40	125	85	160	170	10
$BT_{11,17}$	45	142	97	180	194	14
$BT_{11,19}$	50	159	109	200	218	18

$BT_{11,21}$	55	176	121	220	242	22
$BT_{11,23}$	60	193	133	240	266	26
$BT_{11,25}$	65	210	145	260	290	30
$BT_{11,27}$	70	227	157	280	314	34
$BT_{11,29}$	75	244	169	300	338	38
$BT_{11,31}$	80	261	181	320	362	42
$BT_{11,33}$	85	278	193	340	386	46
$BT_{11,35}$	90	295	205	360	410	50
$BT_{11,37}$	95	312	217	380	434	54
$BT_{11,39}$	100	329	229	400	458	58
$BT_{11,41}$	105	346	241	420	482	62
$BT_{11,43}$	110	363	253	440	506	66
$BT_{11,45}$	115	380	265	460	530	70
$BT_{11,47}$	120	397	277	480	554	74
$BT_{11,49}$	125	414	289	500	578	78
$BT_{11,51}$	130	431	301	520	602	82

So on…..

$BT_{m,n}$	V(0)	V(1)	$\left\|\sum v(0)-\sum v(1)\right\| \geq 2$	e(0)	e(1)	$\left\|\sum e(0)-\sum e(1)\right\| \geq 2$
$BT_{13,5}$	18	47	29	72	58	14
$BT_{13,7}$	24	67	43	96	86	10
$BT_{13,9}$	30	87	57	120	114	6
$BT_{13,11}$	36	107	71	144	142	2
$BT_{13,13}$	42	127	85	168	170	2
$BT_{13,15}$	48	147	99	192	198	6
$BT_{13,17}$	54	167	113	216	226	10
$BT_{13,19}$	60	187	127	240	254	14
$BT_{13,21}$	66	207	141	264	282	18
$BT_{13,23}$	72	227	155	288	310	22
$BT_{13,25}$	78	247	169	312	338	26
$BT_{13,27}$	84	267	183	336	366	30
$BT_{13,29}$	90	287	197	360	394	34
$BT_{13,31}$	96	307	211	384	422	38
$BT_{13,33}$	102	327	225	408	450	42
$BT_{13,35}$	108	347	239	432	478	46
$BT_{13,37}$	114	367	253	456	506	50
$BT_{13,39}$	120	387	267	480	534	54
$BT_{13,41}$	126	407	281	504	562	58
$BT_{13,43}$	132	427	295	528	590	62
$BT_{13,45}$	138	447	309	552	618	66
$BT_{13,47}$	144	467	323	576	646	70
$BT_{13,49}$	150	487	337	600	674	74
$BT_{13,51}$	156	507	351	624	702	78

So on…

Result Table:-

Case-	$\left\|\sum v(0)-\sum v(1)\right\| \geq 2$	$\left\|\sum e(0)-\sum e(1)\right\| \geq 2$
1. When m,n both are even.	$even\ number \geq 2$	$even\ number \geq 2$
2. When m is odd, n is even.	$even\ number \geq 2$	$even\ number \geq 2$
3. When m is even, n is odd.	$even\ number \geq 2$	$even\ number \geq 2$
4. When m,n both are odd.	$odd\ number \geq 2$	$even\ number \geq 2$

Conclusion:-

Here researcher determined the truth table for labeling of Bloom Torus Graph, which satisfies the SmaranDachley Product Cordial Labeling that is a labeling $f : V(G) \to \{0,1\}$ with induced labeling $f(u)\ f(v) on\ edge\ uv \in E(G) that \left|\sum v(0) - \sum v(1)\right| \geq 2$ $and \left|\sum e(0) - \sum e(1)\right| \geq 2$.

A lot of work has been accomplished in this area and still work is being carried out for this Graph.

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