



SMALL GRAPHS WITH EXACTLY TWO NON-NEGATIVE EIGENVALUES

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ABSTRACT. Let G be a graph with eigenvalues $\lambda_1(G) \geq \dots \geq \lambda_n(G)$. In this paper we find all simple graphs G such that G has at most twelve vertices and G has exactly two non-negative eigenvalues. In other words we find all graphs G on n vertices such that $n \leq 12$ and $\lambda_1(G) \geq 0$, $\lambda_2(G) \geq 0$ and $\lambda_3(G) < 0$. We obtain that there are exactly 1575 connected graphs G on $n \leq 12$ vertices with $\lambda_1(G) > 0$, $\lambda_2(G) > 0$ and $\lambda_3(G) < 0$. We find that among these 1575 graphs there are just two integral graphs.

1. Introduction

Throughout this paper all graphs are simple, that is finite and undirected without loops and multiple edges. Let G be a graph with vertex set $\{v_1, \dots, v_n\}$. The adjacency matrix of G , $A(G) = [a_{ij}]$, is an $n \times n$ matrix such that $a_{ij} = 1$ if v_i and v_j are adjacent, and $a_{ij} = 0$, otherwise. Thus $A(G)$ is a symmetric matrix with zeros on the diagonal and all the eigenvalues of $A(G)$ are real. By the eigenvalues of G we mean those of its adjacency matrix. We denote the eigenvalues of G by $\lambda_1(G) \geq \dots \geq \lambda_n(G)$. By the spectrum of G that is denoted by $Spec(G)$, we mean the multiset of eigenvalues of G . The characteristic polynomial of G , $det(\lambda I - A(G))$, is denoted by $P(G, \lambda)$. An *integral graph* is defined as a graph whose its spectrum consists entirely of integers. For a graph G , $V(G)$ and $E(G)$ denote

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the vertex set and the edge set of G , respectively; \overline{G} denotes the complement of G . The *order* of G denotes the number of vertices of G . The *closed neighborhood* of a vertex v of G which is denoted by $N[v]$, is the set $\{u \in V(G) : uv \in E(G)\} \cup \{v\}$. For every vertex $v \in V(G)$, the *degree* of v is the number of edges incident with v . By $\delta(G)$ we mean the minimum degree of vertices of G . For two graphs G and H with disjoint vertex sets, $G + H$ denotes the graph with the vertex set $V(G) \cup V(H)$ and the edge set $E(G) \cup E(H)$, i.e. the disjoint union of two graphs G and H . In particular, nG denotes the disjoint union of n copies of G . The complete product (join) $G \vee H$ of graphs G and H is the graph obtained from $G + H$ by joining every vertex of G with every vertex of H . For positive integers n_1, \dots, n_ℓ , K_{n_1, \dots, n_ℓ} denotes the complete multipartite graph with ℓ parts of sizes n_1, \dots, n_ℓ . Let $K_n, nK_1 = \overline{K_n}, C_n$ and P_n be the complete graph, the null graph, the cycle and the path on n vertices, respectively.

It is well known that $\lambda_1(G) + \dots + \lambda_n(G) = 0$ and $\lambda_1^2(G) + \dots + \lambda_n^2(G) = 2m$, where m is the number of edges of G . Thus if G has at least one edge, then G has at least one positive eigenvalue. One of the attractive problems is the characterization of graphs with a few non-zero eigenvalues. In [1] all bipartite graphs with at most six non-zero eigenvalues have been characterized. The another interesting problem is the characterization of graphs with a few positive eigenvalues. In [5] Smith characterized all graphs with exactly one positive eigenvalue. In fact, a graph has exactly one positive eigenvalue if and only if its non-isolated vertices form a complete multipartite graph. Let G be a graph with eigenvalues $\lambda_1(G) \geq \dots \geq \lambda_n(G)$. In [4] Petrović has studied the characterization of graphs with exactly two non-negative eigenvalues. Recently in [2] the author find all graphs G with exactly two non-negative eigenvalues. In other words all graphs G such that $\lambda_1(G) \geq 0$, $\lambda_2(G) \geq 0$ and $\lambda_3(G) < 0$. It is proved that every graph G with exactly two non-negative eigenvalues and with at least thirteen vertices has specific structure [2]. In this paper using computer we find all graphs G such that G has at most twelve vertices and G has exactly two non-negative eigenvalues. More precisely we show that there are exactly 1575 connected graphs G of order $n \leq 12$ such that $\lambda_1(G) > 0$, $\lambda_2(G) > 0$ and $\lambda_3(G) < 0$. We investigate the integral graphs among these graphs. We find that among these 1575 graphs there are exactly two integral graphs.

2. Graphs with exactly two non-negative eigenvalues

In this section we state the structure of graphs G that have exactly two non-negative eigenvalues. In other words the graphs G with $\lambda_3(G) < 0$. First we recall some definitions that are important for characterizing these graphs, see [2].

Definition 1.[2] For every integer $n \geq 2$, let G_n be the graph of order n such that G_n is obtained from disjoint complete graphs $K_{\lceil \frac{n}{2} \rceil}$ and $K_{\lfloor \frac{n}{2} \rfloor}$ as following: Let $V(K_{\lceil \frac{n}{2} \rceil}) = \{v_1, \dots, v_{\lceil \frac{n}{2} \rceil}\}$ and $V(K_{\lfloor \frac{n}{2} \rfloor}) = \{w_1, \dots, w_{\lfloor \frac{n}{2} \rfloor}\}$. Then add some new edges to $K_{\lceil \frac{n}{2} \rceil} + K_{\lfloor \frac{n}{2} \rfloor}$ such that the following hold:

- (i) $N[v_1] \subset \dots \subset N[v_{\lceil \frac{n}{2} \rceil}]$ and $N[w_1] \subset \dots \subset N[w_{\lfloor \frac{n}{2} \rfloor}]$.

- (ii) $|N[v_i] \cap V(K_{\lfloor \frac{n}{2} \rfloor})| = i - 1$ for $i = 1, \dots, \lfloor \frac{n}{2} \rfloor$.
- (iii) $|N[w_j] \cap V(K_{\lceil \frac{n}{2} \rceil})| = \begin{cases} j - 1, & \text{if } n \text{ is even;} \\ j, & \text{if } n \text{ is odd} \end{cases}$ for $j = 1, \dots, \lfloor \frac{n}{2} \rfloor$.

In Figure 1, the graphs G_2, G_3, G_4, G_5 and G_6 have been shown. In addition in Figure 2 one can see the complement of G_7, \dots, G_{12} . We remark that for every $n \geq 3$, G_n is connected. We note that $G_{2k} = B_{2k}(1, \dots, 1; 1, \dots, 1)$ and $G_{2k+1} = B_{2k+1}(1, \dots, 1; 1, \dots, 1; 1)$, where B_{2k} and B_{2k+1} are the graphs that have been defined in [4].

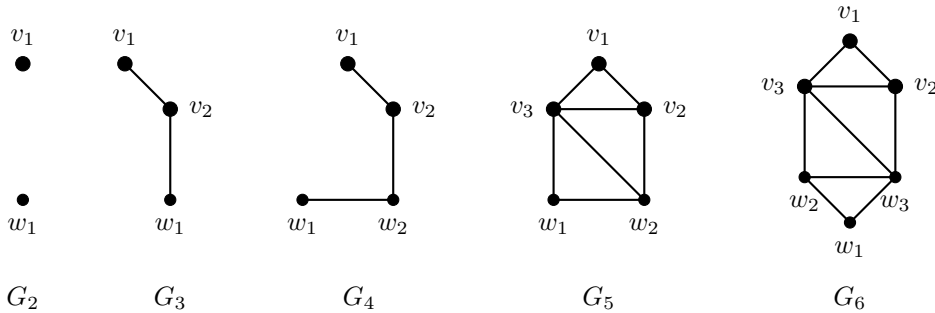


FIGURE 1. The graphs G_2, G_3, G_4, G_5 and G_6 .

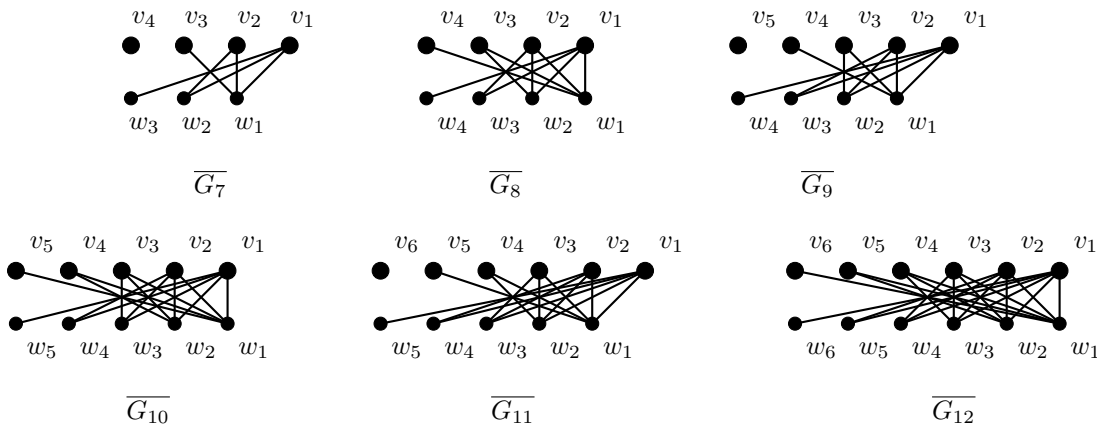


FIGURE 2. The complement graphs of $G_7, G_8, G_9, G_{10}, G_{11}$ and G_{12} .

In fact $\lambda_2(G_n) > 0$ and $\lambda_3(G_n) < 0$ if and only if $4 \leq n \leq 12$, see [2].

Definition 2.[2] Let G be a graph with vertex set $\{v_1, \dots, v_n\}$. By $G[K_{t_1}, \dots, K_{t_n}]$ we mean the graph obtained by replacing the vertex v_j by the complete graph K_{t_j} for $1 \leq j \leq n$, where every vertex of K_{t_i} is adjacent to every vertex of K_{t_j} if and only if v_i is adjacent to v_j (in G). For example $K_2[K_p, K_q] \cong K_{p+q}$ and $\overline{K_2}[K_p, K_q] \cong K_p + K_q$.

One of the main results of [2] is the following.

Theorem 1.[2] Let G be a graph with eigenvalues $\lambda_1 \geq \dots \geq \lambda_n$. Assume that $\lambda_3 < 0$. Then the following hold:

- (1) If $\lambda_1 > 0$ and $\lambda_2 > 0$, then $G \cong K_p + K_q$ for some integers $p, q \geq 2$ or there exist some positive integers s and t_1, \dots, t_s so that $3 \leq s \leq 12$ and $t_1 + \dots + t_s = n$ and $G \cong G_s[K_{t_1}, \dots, K_{t_s}]$.
- (2) If $\lambda_1 > 0$ and $\lambda_2 = 0$, then $G \cong K_1 + K_{n-1}$ or $G \cong K_n \setminus e$, where e is an edge of K_n .
- (3) If $\lambda_1 > 0$ and $\lambda_2 < 0$, then $G \cong K_n$.

The first part of Theorem 1 shows that to complete the characterization of the graphs with $\lambda_3 < 0$ it suffices to find all positive integers of s and t_1, \dots, t_s so that $3 \leq s \leq 12$ and

$$(1) \quad \lambda_1(G_s[K_{t_1}, \dots, K_{t_s}]) > 0, \quad \lambda_2(G_s[K_{t_1}, \dots, K_{t_s}]) > 0, \quad \text{and} \quad \lambda_3(G_s[K_{t_1}, \dots, K_{t_s}]) < 0.$$

We note that for $s \geq 3$, $G_s[K_{t_1}, \dots, K_{t_s}]$ is connected. Also the number of its vertices is $t_1 + \dots + t_s$. In [2] the author has found all values of t_1, \dots, t_s implicitly such that the Equation (1) holds. In fact in [2] it has been shown that every graph G with at least thirteen vertices has special pattern. Here we study those graphs with at most twelve vertices. In fact we determine all positive integers $3 \leq s \leq 12$ and t_1, \dots, t_s such that $t_1 + \dots + t_s \leq 12$ and the Equation (1) holds. In other words we find all connected graphs G with at most twelve vertices such that $\lambda_2 > 0$ and $\lambda_3 < 0$.

One can use the following result to compute the characteristic polynomial of $G_s[K_{t_1}, \dots, K_{t_s}]$, the polynomial $P(G_n[K_{t_1}, \dots, K_{t_n}], \lambda)$.

Theorem 2.[3] Let $n \geq 2$. Suppose that $\{v_1, \dots, v_n\}$ is the vertex set of G_n and $A = [a_{ij}]$ is the adjacency matrix of G_n with respect to $\{v_1, \dots, v_n\}$ ($a_{ij} = 1$ if and only if v_i and v_j are adjacent and $a_{ij} = 0$, otherwise). Let t_1, \dots, t_n be some positive integers and $M = [m_{ij}]$ be a $n \times n$ matrix, where

$$m_{ij} := \begin{cases} t_i - 1, & \text{if } i = j; \\ a_{ij}t_j, & \text{if } i \neq j. \end{cases}$$

Then

$$P(G_n[K_{t_1}, \dots, K_{t_n}], \lambda) = (\lambda + 1)^{t_1 + \dots + t_n - n} g(\lambda),$$

where $g(\lambda) = \det(\lambda I - M)$. In addition, the multiplicity of -1 as an eigenvalue of $G_n[K_{t_1}, \dots, K_{t_n}]$ is equal to $t_1 + \dots + t_n - n$.

3. The list of all connected graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$

In this section we investigate the converse of the first part of Theorem 1. We use Petrović's notation [4] that is very similar to the notation of Definition 2. We note that in Definition 2, the graph $G[H_1, \dots, H_n]$ is dependent to the labeling of the vertices of G while in the next definition first we fix a labeling for the vertices of G_n (see Definition 1), and then use the operation of Definition 2. For instance we consider the labeling v_1, \dots, v_s and w_1, \dots, w_s for the vertices of G_{2s} and then apply the operation of Definition 2.

Definition 3. [2] Let $s \geq 1$ be an integer and n_1, \dots, n_{2s+1} be some positive integers. Let $B_{2s}(n_1, \dots, n_s; n_{s+1}, \dots, n_{2s})$ denote the graph obtained from G_{2s} by replacing the vertices v_1 by K_{n_1} , v_2 by K_{n_2}, \dots , and v_s by K_{n_s} and w_1 by $K_{n_{s+1}}$, w_2 by $K_{n_{s+2}}, \dots$, and w_s by $K_{n_{2s}}$ (see Definition 1). In other words

$$B_{2s}(n_1, \dots, n_s; n_{s+1}, \dots, n_{2s}) = G_{2s}[K_{n_1}, \dots, K_{n_{2s}}],$$

where the ordering of the vertices of G_{2s} is $V(G_{2s}) = \{v_1, \dots, v_s, w_1, \dots, w_s\}$. Similarly, by $B_{2s+1}(n_1, \dots, n_s; n_{s+1}, \dots, n_{2s}; n_{2s+1})$ we mean

$$B_{2s+1}(n_1, \dots, n_s; n_{s+1}, \dots, n_{2s}; n_{2s+1}) = G_{2s+1}[K_{n_1}, \dots, K_{n_{2s+1}}],$$

where the ordering of the vertices of G_{2s+1} is $V(G_{2s+1}) = \{v_1, \dots, v_s, w_1, \dots, w_s, v_{s+1}\}$, (see Figure 3).

Remark 3.1. [2] For every positive integers s and n_1, \dots, n_{2s+1} , one can easily see that

$$B_{2s}(n_1, \dots, n_s; n_{s+1}, \dots, n_{2s}) \cong B_{2s}(n_{s+1}, \dots, n_{2s}; n_1, \dots, n_s),$$

and

$$B_{2s+1}(n_1, \dots, n_s; n_{s+1}, \dots, n_{2s}; n_{2s+1}) \cong B_{2s+1}(n_{s+1}, \dots, n_{2s}; n_1, \dots, n_s; n_{2s+1}).$$

For avoiding the repeating, using the dictionary ordering on (n_1, \dots, n_s) and (n_{s+1}, \dots, n_{2s}) we just cite one of the graphs $B_{2s}(n_1, \dots, n_s; n_{s+1}, \dots, n_{2s})$ or $B_{2s}(n_{s+1}, \dots, n_{2s}; n_1, \dots, n_s)$ in our characterization. Similarly for the graphs $B_{2s+1}(n_1, \dots, n_s; n_{s+1}, \dots, n_{2s}; n_{2s+1})$ and

$B_{2s+1}(n_{s+1}, \dots, n_{2s}; n_1, \dots, n_s; n_{2s+1})$ we only consider one of them. For example since by dictionary ordering $(4, 3, 2) \geq (4, 3, 1)$ we use $B_6(4, 3, 2; 4, 3, 1)$ instead of $B_6(4, 3, 1; 4, 3, 2)$. As another example we use $B_7(5, 3, 2; 5, 2, 4; 8)$ instead of $B_7(5, 2, 4; 5, 3, 2; 8)$, since $(5, 3, 2) \geq (5, 2, 4)$.

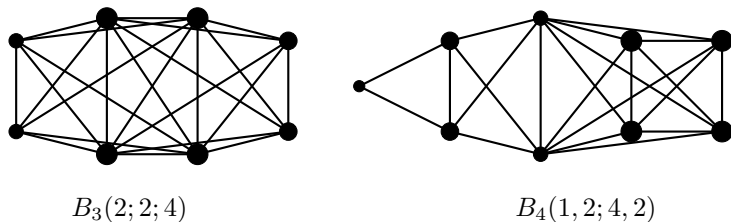


FIGURE 3. The graphs $B_3(2; 2; 4)$ and $B_4(1, 2; 4, 2)$.

Now we are in a position to state the main result of the paper. Using Theorem 2 and computer one can check the the following.

Theorem 3. Let G be a connected graph of order $n \leq 12$. Then $\lambda_1(G) > 0$, $\lambda_2(G) > 0$ and $\lambda_3(G) < 0$ if and only if G is isomorphic with one of the 1575 following graphs:

- (1) $B_3(2; 1; 1)$.
- (2) $B_3(2; 1; 2), B_3(2; 2; 1), B_3(3; 1; 1)$.

- (3) $B_3(2; 1; 3), B_3(2; 2; 2), B_3(3; 1; 2), B_3(3; 2; 1), B_3(4; 1; 1)$.
- (4) $B_3(2; 1; 4), B_3(2; 2; 3), B_3(3; 1; 3), B_3(3; 2; 2), B_3(3; 3; 1), B_3(4; 1; 2), B_3(4; 2; 1), B_3(5; 1; 1)$.
- (5) $B_3(2; 1; 5), B_3(2; 2; 4), B_3(3; 1; 4), B_3(3; 2; 3), B_3(3; 3; 2), B_3(4; 1; 3), B_3(4; 2; 2), B_3(4; 3; 1)$.
- (6) $B_3(5; 1; 2), B_3(5; 2; 1), B_3(6; 1; 1)$.
- (7) $B_3(2; 1; 6), B_3(2; 2; 5), B_3(3; 1; 5), B_3(3; 2; 4), B_3(3; 3; 3), B_3(4; 1; 4), B_3(4; 2; 3), B_3(4; 3; 2)$.
- (8) $B_3(4; 4; 1), B_3(5; 1; 3), B_3(5; 2; 2), B_3(5; 3; 1), B_3(6; 1; 2), B_3(6; 2; 1), B_3(7; 1; 1)$.
- (9) $B_3(2; 1; 7), B_3(2; 2; 6), B_3(3; 1; 6), B_3(3; 2; 5), B_3(3; 3; 4), B_3(4; 1; 5), B_3(4; 2; 4), B_3(4; 3; 3)$.
- (10) $B_3(4; 4; 2), B_3(5; 1; 4), B_3(5; 2; 3), B_3(5; 3; 2), B_3(5; 4; 1), B_3(6; 1; 3), B_3(6; 2; 2), B_3(6; 3; 1)$.
- (11) $B_3(7; 1; 2), B_3(7; 2; 1), B_3(8; 1; 1)$.
- (12) $B_3(2; 1; 8), B_3(2; 2; 7), B_3(3; 1; 7), B_3(3; 2; 6), B_3(3; 3; 5), B_3(4; 1; 6), B_3(4; 2; 5), B_3(4; 3; 4)$.
- (13) $B_3(4; 4; 3), B_3(5; 1; 5), B_3(5; 2; 4), B_3(5; 3; 3), B_3(5; 4; 2), B_3(5; 5; 1), B_3(6; 1; 4), B_3(6; 2; 3)$.
- (14) $B_3(6; 3; 2), B_3(6; 4; 1), B_3(7; 1; 3), B_3(7; 2; 2), B_3(7; 3; 1), B_3(8; 1; 2), B_3(8; 2; 1), B_3(9; 1; 1)$.
- (15) $B_3(2; 1; 9), B_3(2; 2; 8), B_3(3; 1; 8), B_3(3; 2; 7), B_3(3; 3; 6), B_3(4; 1; 7), B_3(4; 2; 6), B_3(4; 3; 5)$.
- (16) $B_3(4; 4; 4), B_3(5; 1; 6), B_3(5; 2; 5), B_3(5; 3; 4), B_3(5; 4; 3), B_3(5; 5; 2), B_3(6; 1; 5), B_3(6; 2; 4)$.
- (17) $B_3(6; 3; 3), B_3(6; 4; 2), B_3(6; 5; 1), B_3(7; 1; 4), B_3(7; 2; 3), B_3(7; 3; 2), B_3(7; 4; 1), B_3(8; 1; 3)$.
- (18) $B_3(8; 2; 2), B_3(8; 3; 1), B_3(9; 1; 2), B_3(9; 2; 1), B_3(10; 1; 1)$.
- (19) $B_4(1, 1; 1, 1)$.
- (20) $B_4(1, 2; 1, 1), B_4(2, 1; 1, 1)$.
- (21) $B_4(1, 2; 1, 2), B_4(1, 3; 1, 1), B_4(2, 1; 1, 2), B_4(2, 1; 2, 1), B_4(2, 2; 1, 1), B_4(3, 1; 1, 1)$.
- (22) $B_4(1, 3; 1, 2), B_4(1, 4; 1, 1), B_4(2, 1; 1, 3), B_4(2, 2; 1, 2), B_4(2, 2; 2, 1)$.
- (23) $B_4(2, 3; 1, 1), B_4(3, 1; 1, 2), B_4(3, 1; 2, 1), B_4(3, 2; 1, 1), B_4(4, 1; 1, 1)$.
- (24) $B_4(1, 3; 1, 3), B_4(1, 4; 1, 2), B_4(1, 5; 1, 1), B_4(2, 1; 1, 4), B_4(2, 2; 1, 3), B_4(2, 2; 2, 2), B_4(2, 3; 1, 2)$.
- (25) $B_4(2, 3; 2, 1), B_4(2, 4; 1, 1), B_4(3, 1; 1, 3), B_4(3, 1; 2, 2), B_4(3, 1; 3, 1), B_4(3, 2; 1, 2), B_4(3, 2; 2, 1)$.
- (26) $B_4(3, 3; 1, 1), B_4(4, 1; 1, 2), B_4(4, 1; 2, 1), B_4(4, 2; 1, 1), B_4(5, 1; 1, 1)$.
- (27) $B_4(1, 4; 1, 3), B_4(1, 5; 1, 2), B_4(1, 6; 1, 1), B_4(2, 1; 1, 5), B_4(2, 2; 1, 4), B_4(2, 3; 1, 3), B_4(2, 3; 2, 2)$.
- (28) $B_4(2, 4; 1, 2), B_4(2, 4; 2, 1), B_4(2, 5; 1, 1), B_4(3, 1; 1, 4), B_4(3, 1; 2, 3), B_4(3, 2; 1, 3), B_4(3, 2; 2, 2)$.
- (29) $B_4(3, 2; 3, 1), B_4(3, 3; 1, 2), B_4(3, 3; 2, 1), B_4(3, 4; 1, 1), B_4(4, 1; 1, 3), B_4(4, 1; 2, 2), B_4(4, 1; 3, 1)$.
- (30) $B_4(4, 2; 1, 2), B_4(4, 2; 2, 1), B_4(4, 3; 1, 1), B_4(5, 1; 1, 2), B_4(5, 1; 2, 1), B_4(5, 2; 1, 1), B_4(6, 1; 1, 1)$.
- (31) $B_4(1, 4; 1, 4), B_4(1, 5; 1, 3), B_4(1, 6; 1, 2), B_4(1, 7; 1, 1), B_4(2, 1; 1, 6), B_4(2, 2; 1, 5), B_4(2, 3; 1, 4)$.
- (32) $B_4(2, 3; 2, 3), B_4(2, 4; 1, 3), B_4(2, 4; 2, 2), B_4(2, 5; 1, 2), B_4(2, 5; 2, 1), B_4(2, 6; 1, 1), B_4(3, 1; 1, 5)$.
- (33) $B_4(3, 1; 2, 4), B_4(3, 2; 1, 4), B_4(3, 2; 2, 3), B_4(3, 3; 1, 3), B_4(3, 3; 2, 2), B_4(3, 3; 3, 1), B_4(3, 4; 1, 2)$.
- (34) $B_4(3, 4; 2, 1), B_4(3, 5; 1, 1), B_4(4, 1; 1, 4), B_4(4, 1; 2, 3), B_4(4, 1; 3, 2), B_4(4, 1; 4, 1), B_4(4, 2; 1, 3)$.
- (35) $B_4(4, 2; 2, 2), B_4(4, 2; 3, 1), B_4(4, 3; 1, 2), B_4(4, 3; 2, 1), B_4(4, 4; 1, 1), B_4(5, 1; 1, 3), B_4(5, 1; 2, 2)$.
- (36) $B_4(5, 1; 3, 1), B_4(5, 2; 1, 2), B_4(5, 2; 2, 1), B_4(5, 3; 1, 1), B_4(6, 1; 1, 2), B_4(6, 1; 2, 1), B_4(6, 2; 1, 1)$.
- (37) $B_4(7, 1; 1, 1)$.
- (38) $B_4(1, 5; 1, 4), B_4(1, 6; 1, 3), B_4(1, 7; 1, 2), B_4(1, 8; 1, 1), B_4(2, 1; 1, 7), B_4(2, 2; 1, 6), B_4(2, 3; 1, 5)$.

- (39) $B_4(2, 4; 1, 4), B_4(2, 4; 2, 3), B_4(2, 5; 1, 3), B_4(2, 5; 2, 2), B_4(2, 6; 1, 2), B_4(2, 6; 2, 1), B_4(2, 7; 1, 1)$.
- (40) $B_4(3, 1; 1, 6), B_4(3, 1; 2, 5), B_4(3, 2; 1, 5), B_4(3, 2; 2, 4), B_4(3, 3; 1, 4), B_4(3, 3; 2, 3), B_4(3, 4; 1, 3)$.
- (41) $B_4(3, 4; 2, 2), B_4(3, 4; 3, 1), B_4(3, 5; 1, 2), B_4(3, 5; 2, 1), B_4(3, 6; 1, 1), B_4(4, 1; 1, 5), B_4(4, 1; 2, 4)$.
- (42) $B_4(4, 1; 3, 3), B_4(4, 2; 1, 4), B_4(4, 2; 2, 3), B_4(4, 2; 4, 1), B_4(4, 3; 1, 3), B_4(4, 4; 1, 2), B_4(4, 4; 2, 1)$.
- (43) $B_4(4, 5; 1, 1), B_4(5, 1; 1, 4), B_4(5, 1; 2, 3), B_4(5, 1; 3, 2), B_4(5, 1; 4, 1), B_4(5, 2; 1, 3), B_4(5, 2; 2, 2)$.
- (44) $B_4(5, 2; 3, 1), B_4(5, 3; 1, 2), B_4(5, 3; 2, 1), B_4(5, 4; 1, 1), B_4(6, 1; 1, 3), B_4(6, 1; 2, 2), B_4(6, 1; 3, 1)$.
- (45) $B_4(6, 2; 1, 2), B_4(6, 2; 2, 1), B_4(6, 3; 1, 1), B_4(7, 1; 1, 2), B_4(7, 1; 2, 1), B_4(7, 2; 1, 1), B_4(8, 1; 1, 1)$.
- (46) $B_4(1, 5; 1, 5), B_4(1, 6; 1, 4), B_4(1, 7; 1, 3), B_4(1, 8; 1, 2), B_4(1, 9; 1, 1), B_4(2, 1; 1, 8), B_4(2, 2; 1, 7)$.
- (47) $B_4(2, 3; 1, 6), B_4(2, 4; 1, 5), B_4(2, 4; 2, 4), B_4(2, 5; 1, 4), B_4(2, 5; 2, 3), B_4(2, 6; 1, 3), B_4(2, 6; 2, 2)$.
- (48) $B_4(2, 7; 1, 2), B_4(2, 7; 2, 1), B_4(2, 8; 1, 1), B_4(3, 1; 1, 7), B_4(3, 1; 2, 6), B_4(3, 2; 1, 6), B_4(3, 2; 2, 5)$.
- (49) $B_4(3, 3; 1, 5), B_4(3, 3; 2, 4), B_4(3, 4; 1, 4), B_4(3, 5; 1, 3), B_4(3, 5; 2, 2), B_4(3, 5; 3, 1), B_4(3, 6; 1, 2)$.
- (50) $B_4(3, 6; 2, 1), B_4(3, 7; 1, 1), B_4(4, 1; 1, 6), B_4(4, 1; 2, 5), B_4(4, 2; 1, 5), B_4(4, 2; 2, 4), B_4(4, 3; 1, 4)$.
- (51) $B_4(4, 4; 1, 3), B_4(4, 5; 1, 2), B_4(4, 5; 2, 1), B_4(4, 6; 1, 1), B_4(5, 1; 1, 5), B_4(5, 1; 2, 4), B_4(5, 1; 3, 3)$.
- (52) $B_4(5, 1; 4, 2), B_4(5, 1; 5, 1), B_4(5, 2; 1, 4), B_4(5, 3; 1, 3), B_4(5, 4; 1, 2), B_4(5, 5; 1, 1), B_4(6, 1; 1, 4)$.
- (53) $B_4(6, 1; 2, 3), B_4(6, 1; 3, 2), B_4(6, 1; 4, 1), B_4(6, 2; 1, 3), B_4(6, 2; 2, 2), B_4(6, 2; 3, 1), B_4(6, 3; 1, 2)$.
- (54) $B_4(6, 3; 2, 1), B_4(6, 4; 1, 1), B_4(7, 1; 1, 3), B_4(7, 1; 2, 2), B_4(7, 1; 3, 1), B_4(7, 2; 1, 2), B_4(7, 2; 2, 1)$.
- (55) $B_4(7, 3; 1, 1), B_4(8, 1; 1, 2), B_4(8, 1; 2, 1), B_4(8, 2; 1, 1), B_4(9, 1; 1, 1)$.
- (56) $B_5(1, 1; 1, 1; 1)$.
- (57) $B_5(1, 1; 1, 1; 2), B_5(1, 2; 1, 1; 1), B_5(2, 1; 1, 1; 1)$.
- (58) $B_5(1, 1; 1, 1; 3), B_5(1, 2; 1, 1; 2), B_5(1, 2; 1, 2; 1), B_5(1, 3; 1, 1; 1), B_5(2, 1; 1, 1; 2), B_5(2, 1; 1, 2; 1)$.
- (59) $B_5(2, 1; 2, 1; 1), B_5(2, 2; 1, 1; 1), B_5(3, 1; 1, 1; 1)$.
- (60) $B_5(1, 1; 1, 1; 4), B_5(1, 2; 1, 1; 3), B_5(1, 2; 1, 2; 2), B_5(1, 3; 1, 1; 2), B_5(1, 3; 1, 2; 1), B_5(1, 4; 1, 1; 1)$.
- (61) $B_5(2, 1; 1, 1; 3), B_5(2, 1; 1, 2; 2), B_5(2, 1; 1, 3; 1), B_5(2, 1; 2, 1; 2), B_5(2, 2; 1, 1; 2), B_5(2, 2; 1, 2; 1)$.
- (62) $B_5(2, 2; 2, 1; 1), B_5(2, 3; 1, 1; 1), B_5(3, 1; 1, 1; 2), B_5(3, 1; 1, 2; 1), B_5(3, 1; 2, 1; 1), B_5(3, 2; 1, 1; 1)$.
- (63) $B_5(4, 1; 1, 1; 1)$.
- (64) $B_5(1, 1; 1, 1; 5), B_5(1, 2; 1, 1; 4), B_5(1, 2; 1, 2; 3), B_5(1, 3; 1, 1; 3), B_5(1, 3; 1, 2; 2), B_5(1, 3; 1, 3; 1)$.
- (65) $B_5(1, 4; 1, 1; 2), B_5(1, 4; 1, 2; 1), B_5(1, 5; 1, 1; 1), B_5(2, 1; 1, 1; 4), B_5(2, 1; 1, 2; 3), B_5(2, 1; 1, 3; 2)$.
- (66) $B_5(2, 1; 1, 4; 1), B_5(2, 1; 2, 1; 3), B_5(2, 2; 1, 1; 3), B_5(2, 2; 1, 2; 2), B_5(2, 2; 1, 3; 1), B_5(2, 2; 2, 1; 2)$.
- (67) $B_5(2, 3; 1, 1; 2), B_5(2, 3; 1, 2; 1), B_5(2, 3; 2, 1; 1), B_5(2, 4; 1, 1; 1), B_5(3, 1; 1, 1; 3), B_5(3, 1; 1, 2; 2)$.
- (68) $B_5(3, 1; 1, 3; 1), B_5(3, 1; 2, 1; 2), B_5(3, 1; 2, 2; 1), B_5(3, 1; 3, 1; 1), B_5(3, 2; 1, 1; 2), B_5(3, 2; 1, 2; 1)$.
- (69) $B_5(3, 2; 2, 1; 1), B_5(3, 3; 1, 1; 1), B_5(4, 1; 1, 1; 2), B_5(4, 1; 1, 2; 1), B_5(4, 1; 2, 1; 1), B_5(4, 2; 1, 1; 1)$.
- (70) $B_5(5, 1; 1, 1; 1)$.
- (71) $B_5(1, 1; 1, 1; 6), B_5(1, 2; 1, 1; 5), B_5(1, 2; 1, 2; 4), B_5(1, 3; 1, 1; 4), B_5(1, 3; 1, 2; 3), B_5(1, 3; 1, 3; 2)$.
- (72) $B_5(1, 4; 1, 1; 3), B_5(1, 4; 1, 2; 2), B_5(1, 4; 1, 3; 1), B_5(1, 5; 1, 1; 2), B_5(1, 5; 1, 2; 1), B_5(1, 6; 1, 1; 1)$.
- (73) $B_5(2, 1; 1, 1; 5), B_5(2, 1; 1, 2; 4), B_5(2, 1; 1, 3; 3), B_5(2, 1; 1, 4; 2), B_5(2, 1; 1, 5; 1), B_5(2, 1; 2, 1; 4)$.
- (74) $B_5(2, 2; 1, 1; 4), B_5(2, 2; 1, 2; 3), B_5(2, 2; 1, 3; 2), B_5(2, 2; 1, 4; 1), B_5(2, 2; 2, 1; 3), B_5(2, 3; 1, 1; 3)$.

- (75) $B_5(2, 3; 1, 3; 1), B_5(2, 3; 2, 1; 2), B_5(2, 4; 1, 1; 2), B_5(2, 4; 1, 2; 1), B_5(2, 4; 2, 1; 1), B_5(2, 5; 1, 1; 1)$.
- (76) $B_5(3, 1; 1, 1; 4), B_5(3, 1; 1, 2; 3), B_5(3, 1; 1, 3; 2), B_5(3, 1; 1, 4; 1), B_5(3, 1; 2, 1; 3), B_5(3, 1; 2, 2; 2)$.
- (77) $B_5(3, 1; 2, 3; 1), B_5(3, 1; 3, 1; 2), B_5(3, 2; 1, 1; 3), B_5(3, 2; 1, 2; 2), B_5(3, 2; 1, 3; 1), B_5(3, 2; 2, 1; 2)$.
- (78) $B_5(3, 2; 3, 1; 1), B_5(3, 3; 1, 1; 2), B_5(3, 3; 1, 2; 1), B_5(3, 4; 1, 1; 1), B_5(4, 1; 1, 1; 3), B_5(4, 1; 1, 2; 2)$.
- (79) $B_5(4, 1; 1, 3; 1), B_5(4, 1; 2, 1; 2), B_5(4, 1; 2, 2; 1), B_5(4, 1; 3, 1; 1), B_5(4, 2; 1, 1; 2), B_5(4, 2; 1, 2; 1)$.
- (80) $B_5(4, 2; 2, 1; 1), B_5(4, 3; 1, 1; 1), B_5(5, 1; 1, 1; 2), B_5(5, 1; 1, 2; 1), B_5(5, 1; 2, 1; 1), B_5(5, 2; 1, 1; 1)$.
- (81) $B_5(6, 1; 1, 1; 1)$.
- (82) $B_5(1, 1; 1, 1; 7), B_5(1, 2; 1, 1; 6), B_5(1, 2; 1, 2; 5), B_5(1, 3; 1, 1; 5), B_5(1, 3; 1, 2; 4), B_5(1, 4; 1, 1; 4)$.
- (83) $B_5(1, 4; 1, 2; 3), B_5(1, 4; 1, 3; 2), B_5(1, 4; 1, 4; 1), B_5(1, 5; 1, 1; 3), B_5(1, 5; 1, 2; 2), B_5(1, 5; 1, 3; 1)$.
- (84) $B_5(1, 6; 1, 1; 2), B_5(1, 6; 1, 2; 1), B_5(1, 7; 1, 1; 1), B_5(2, 1; 1, 1; 6), B_5(2, 1; 1, 2; 5), B_5(2, 1; 1, 3; 4)$.
- (85) $B_5(2, 1; 1, 4; 3), B_5(2, 1; 1, 5; 2), B_5(2, 1; 1, 6; 1), B_5(2, 1; 2, 1; 5), B_5(2, 2; 1, 1; 5), B_5(2, 2; 1, 2; 4)$.
- (86) $B_5(2, 2; 1, 4; 2), B_5(2, 2; 1, 5; 1), B_5(2, 2; 2, 1; 4), B_5(2, 3; 1, 1; 4), B_5(2, 3; 1, 4; 1), B_5(2, 3; 2, 1; 3)$.
- (87) $B_5(2, 4; 1, 1; 3), B_5(2, 4; 1, 3; 1), B_5(2, 5; 1, 1; 2), B_5(2, 5; 1, 2; 1), B_5(2, 5; 2, 1; 1), B_5(2, 6; 1, 1; 1)$.
- (88) $B_5(3, 1; 1, 1; 5), B_5(3, 1; 1, 2; 4), B_5(3, 1; 1, 3; 3), B_5(3, 1; 1, 4; 2), B_5(3, 1; 1, 5; 1), B_5(3, 1; 2, 1; 4)$.
- (89) $B_5(3, 1; 2, 2; 3), B_5(3, 1; 2, 3; 2), B_5(3, 1; 2, 4; 1), B_5(3, 1; 3, 1; 3), B_5(3, 2; 1, 1; 4), B_5(3, 2; 1, 2; 3)$.
- (90) $B_5(3, 2; 1, 3; 2), B_5(3, 2; 1, 4; 1), B_5(3, 2; 2, 1; 3), B_5(3, 2; 3, 1; 2), B_5(3, 3; 1, 1; 3), B_5(3, 3; 1, 3; 1)$.
- (91) $B_5(3, 5; 1, 1; 1), B_5(4, 1; 1, 1; 4), B_5(4, 1; 1, 2; 3), B_5(4, 1; 1, 3; 2), B_5(4, 1; 1, 4; 1), B_5(4, 1; 2, 1; 3)$.
- (92) $B_5(4, 1; 2, 2; 2), B_5(4, 1; 2, 3; 1), B_5(4, 1; 3, 1; 2), B_5(4, 1; 3, 2; 1), B_5(4, 1; 4, 1; 1), B_5(4, 2; 1, 1; 3)$.
- (93) $B_5(4, 2; 1, 2; 2), B_5(4, 2; 1, 3; 1), B_5(4, 2; 2, 1; 2), B_5(4, 3; 1, 1; 2), B_5(4, 3; 1, 2; 1), B_5(4, 4; 1, 1; 1)$.
- (94) $B_5(5, 1; 1, 1; 3), B_5(5, 1; 1, 2; 2), B_5(5, 1; 1, 3; 1), B_5(5, 1; 2, 1; 2), B_5(5, 1; 2, 2; 1), B_5(5, 1; 3, 1; 1)$.
- (95) $B_5(5, 2; 1, 1; 2), B_5(5, 2; 1, 2; 1), B_5(5, 2; 2, 1; 1), B_5(5, 3; 1, 1; 1), B_5(6, 1; 1, 1; 2), B_5(6, 1; 1, 2; 1)$.
- (96) $B_5(6, 1; 2, 1; 1), B_5(6, 2; 1, 1; 1), B_5(7, 1; 1, 1; 1)$.
- (97) $B_5(1, 1; 1, 1; 8), B_5(1, 2; 1, 1; 7), B_5(1, 2; 1, 2; 6), B_5(1, 3; 1, 1; 6), B_5(1, 3; 1, 2; 5), B_5(1, 4; 1, 1; 5)$.
- (98) $B_5(1, 5; 1, 1; 4), B_5(1, 5; 1, 2; 3), B_5(1, 5; 1, 3; 2), B_5(1, 5; 1, 4; 1), B_5(1, 6; 1, 1; 3), B_5(1, 6; 1, 2; 2)$.
- (99) $B_5(1, 6; 1, 3; 1), B_5(1, 7; 1, 1; 2), B_5(1, 7; 1, 2; 1), B_5(1, 8; 1, 1; 1), B_5(2, 1; 1, 1; 7), B_5(2, 1; 1, 2; 6)$.
- (100) $B_5(2, 1; 1, 3; 5), B_5(2, 1; 1, 4; 4), B_5(2, 1; 1, 5; 3), B_5(2, 1; 1, 6; 2), B_5(2, 1; 1, 7; 1), B_5(2, 1; 2, 1; 6)$.
- (101) $B_5(2, 2; 1, 1; 6), B_5(2, 2; 1, 2; 5), B_5(2, 2; 1, 5; 2), B_5(2, 2; 1, 6; 1), B_5(2, 2; 2, 1; 5), B_5(2, 3; 1, 1; 5)$.
- (102) $B_5(2, 3; 1, 5; 1), B_5(2, 3; 2, 1; 4), B_5(2, 4; 1, 1; 4), B_5(2, 4; 1, 4; 1), B_5(2, 6; 1, 1; 2), B_5(2, 6; 1, 2; 1)$.
- (103) $B_5(2, 6; 2, 1; 1), B_5(2, 7; 1, 1; 1), B_5(3, 1; 1, 1; 6), B_5(3, 1; 1, 2; 5), B_5(3, 1; 1, 3; 4), B_5(3, 1; 1, 4; 3)$.
- (104) $B_5(3, 1; 1, 5; 2), B_5(3, 1; 1, 6; 1), B_5(3, 1; 2, 1; 5), B_5(3, 1; 2, 2; 4), B_5(3, 1; 3, 1; 4), B_5(3, 2; 1, 1; 5)$.
- (105) $B_5(3, 2; 1, 5; 1), B_5(3, 2; 2, 1; 4), B_5(3, 2; 3, 1; 3), B_5(3, 3; 1, 1; 4), B_5(3, 3; 1, 4; 1), B_5(3, 6; 1, 1; 1)$.
- (106) $B_5(4, 1; 1, 1; 5), B_5(4, 1; 1, 2; 4), B_5(4, 1; 1, 3; 3), B_5(4, 1; 1, 4; 2), B_5(4, 1; 1, 5; 1), B_5(4, 1; 2, 1; 4)$.
- (107) $B_5(4, 1; 2, 2; 3), B_5(4, 1; 2, 3; 2), B_5(4, 1; 2, 4; 1), B_5(4, 1; 3, 1; 3), B_5(4, 1; 4, 1; 2), B_5(4, 2; 1, 1; 4)$.
- (108) $B_5(4, 2; 1, 2; 3), B_5(4, 2; 1, 3; 2), B_5(4, 2; 1, 4; 1), B_5(4, 2; 2, 1; 3), B_5(5, 1; 1, 1; 4), B_5(5, 1; 1, 2; 3)$.
- (109) $B_5(5, 1; 1, 3; 2), B_5(5, 1; 1, 4; 1), B_5(5, 1; 2, 1; 3), B_5(5, 1; 2, 2; 2), B_5(5, 1; 2, 3; 1), B_5(5, 1; 3, 1; 2)$.
- (110) $B_5(5, 1; 3, 2; 1), B_5(5, 1; 4, 1; 1), B_5(5, 2; 1, 1; 3), B_5(5, 2; 1, 2; 2), B_5(5, 2; 1, 3; 1), B_5(5, 3; 1, 1; 2)$.

- (111) $B_5(5, 3; 1, 2; 1), B_5(5, 4; 1, 1; 1), B_5(6, 1; 1, 1; 3), B_5(6, 1; 1, 2; 2), B_5(6, 1; 1, 3; 1), B_5(6, 1; 2, 1; 2)$.
- (112) $B_5(6, 1; 2, 2; 1), B_5(6, 1; 3, 1; 1), B_5(6, 2; 1, 1; 2), B_5(6, 2; 1, 2; 1), B_5(6, 2; 2, 1; 1), B_5(6, 3; 1, 1; 1)$.
- (113) $B_5(7, 1; 1, 1; 2), B_5(7, 1; 1, 2; 1), B_5(7, 1; 2, 1; 1), B_5(7, 2; 1, 1; 1), B_5(8, 1; 1, 1; 1)$.
- (114) $B_6(1, 1, 1; 1, 1, 1)$.
- (115) $B_6(1, 1, 2; 1, 1, 1), B_6(1, 2, 1; 1, 1, 1), B_6(2, 1, 1; 1, 1, 1)$.
- (116) $B_6(1, 1, 2; 1, 1, 2), B_6(1, 1, 3; 1, 1, 1), B_6(1, 2, 1; 1, 1, 2), B_6(1, 2, 1; 1, 2, 1), B_6(1, 2, 2; 1, 1, 1)$.
- (117) $B_6(1, 3, 1; 1, 1, 1), B_6(2, 1, 1; 1, 1, 2), B_6(2, 1, 1; 1, 2, 1), B_6(2, 1, 1; 2, 1, 1), B_6(2, 1, 2; 1, 1, 1)$.
- (118) $B_6(2, 2, 1; 1, 1, 1), B_6(3, 1, 1; 1, 1, 1)$.
- (119) $B_6(1, 1, 3; 1, 1, 2), B_6(1, 1, 4; 1, 1, 1), B_6(1, 2, 1; 1, 1, 3), B_6(1, 2, 2; 1, 1, 2), B_6(1, 2, 2; 1, 2, 1)$.
- (120) $B_6(1, 2, 3; 1, 1, 1), B_6(1, 3, 1; 1, 1, 2), B_6(1, 3, 1; 1, 2, 1), B_6(1, 3, 2; 1, 1, 1), B_6(1, 4, 1; 1, 1, 1)$.
- (121) $B_6(2, 1, 1; 1, 1, 3), B_6(2, 1, 1; 1, 2, 2), B_6(2, 1, 1; 1, 3, 1), B_6(2, 1, 2; 1, 1, 2), B_6(2, 1, 2; 1, 2, 1)$.
- (122) $B_6(2, 1, 2; 2, 1, 1), B_6(2, 1, 3; 1, 1, 1), B_6(2, 2, 1; 1, 1, 2), B_6(2, 2, 1; 1, 2, 1), B_6(2, 2, 1; 2, 1, 1)$.
- (123) $B_6(2, 2, 2; 1, 1, 1), B_6(2, 3, 1; 1, 1, 1), B_6(3, 1, 1; 1, 1, 2), B_6(3, 1, 1; 1, 2, 1), B_6(3, 1, 1; 2, 1, 1)$.
- (124) $B_6(3, 1, 2; 1, 1, 1), B_6(3, 2, 1; 1, 1, 1), B_6(4, 1, 1; 1, 1, 1)$.
- (125) $B_6(1, 1, 3; 1, 1, 3), B_6(1, 1, 4; 1, 1, 2), B_6(1, 1, 5; 1, 1, 1), B_6(1, 2, 1; 1, 1, 4), B_6(1, 2, 2; 1, 1, 3)$.
- (126) $B_6(1, 2, 3; 1, 1, 2), B_6(1, 2, 3; 1, 2, 1), B_6(1, 2, 4; 1, 1, 1), B_6(1, 3, 1; 1, 1, 3), B_6(1, 3, 1; 1, 2, 2)$.
- (127) $B_6(1, 3, 1; 1, 3, 1), B_6(1, 3, 2; 1, 1, 2), B_6(1, 3, 2; 1, 2, 1), B_6(1, 3, 3; 1, 1, 1), B_6(1, 4, 1; 1, 1, 2)$.
- (128) $B_6(1, 4, 1; 1, 2, 1), B_6(1, 4, 2; 1, 1, 1), B_6(1, 5, 1; 1, 1, 1), B_6(2, 1, 1; 1, 1, 4), B_6(2, 1, 1; 1, 2, 3)$.
- (129) $B_6(2, 1, 1; 1, 3, 2), B_6(2, 1, 1; 1, 4, 1), B_6(2, 1, 2; 1, 1, 3), B_6(2, 1, 2; 1, 2, 2), B_6(2, 1, 2; 1, 3, 1)$.
- (130) $B_6(2, 1, 2; 2, 1, 2), B_6(2, 1, 3; 1, 1, 2), B_6(2, 1, 3; 1, 2, 1), B_6(2, 1, 3; 2, 1, 1), B_6(2, 1, 4; 1, 1, 1)$.
- (131) $B_6(2, 2, 1; 1, 1, 3), B_6(2, 2, 1; 1, 3, 1), B_6(2, 2, 1; 2, 1, 2), B_6(2, 2, 1; 2, 2, 1), B_6(2, 2, 2; 1, 1, 2)$.
- (132) $B_6(2, 2, 2; 1, 2, 1), B_6(2, 2, 2; 2, 1, 1), B_6(2, 2, 3; 1, 1, 1), B_6(2, 3, 1; 1, 1, 2), B_6(2, 3, 1; 1, 2, 1)$.
- (133) $B_6(2, 3, 1; 2, 1, 1), B_6(2, 3, 2; 1, 1, 1), B_6(2, 4, 1; 1, 1, 1), B_6(3, 1, 1; 1, 1, 3), B_6(3, 1, 1; 1, 2, 2)$.
- (134) $B_6(3, 1, 1; 1, 3, 1), B_6(3, 1, 1; 2, 1, 2), B_6(3, 1, 1; 2, 2, 1), B_6(3, 1, 1; 3, 1, 1), B_6(3, 1, 2; 1, 1, 2)$.
- (135) $B_6(3, 1, 2; 1, 2, 1), B_6(3, 1, 2; 2, 1, 1), B_6(3, 1, 3; 1, 1, 1), B_6(3, 2, 1; 1, 1, 2), B_6(3, 2, 1; 1, 2, 1)$.
- (136) $B_6(3, 2, 1; 2, 1, 1), B_6(3, 2, 2; 1, 1, 1), B_6(3, 3, 1; 1, 1, 1), B_6(4, 1, 1; 1, 1, 2), B_6(4, 1, 1; 1, 2, 1)$.
- (137) $B_6(4, 1, 1; 2, 1, 1), B_6(4, 1, 2; 1, 1, 1), B_6(4, 2, 1; 1, 1, 1), B_6(5, 1, 1; 1, 1, 1)$.
- (138) $B_6(1, 1, 4; 1, 1, 3), B_6(1, 1, 5; 1, 1, 2), B_6(1, 1, 6; 1, 1, 1), B_6(1, 2, 1; 1, 1, 5), B_6(1, 2, 2; 1, 1, 4)$.
- (139) $B_6(1, 2, 3; 1, 1, 3), B_6(1, 2, 4; 1, 1, 2), B_6(1, 2, 4; 1, 2, 1), B_6(1, 2, 5; 1, 1, 1), B_6(1, 3, 1; 1, 1, 4)$.
- (140) $B_6(1, 3, 1; 1, 2, 3), B_6(1, 3, 2; 1, 1, 3), B_6(1, 3, 2; 1, 3, 1), B_6(1, 3, 4; 1, 1, 1), B_6(1, 4, 1; 1, 1, 3)$.
- (141) $B_6(1, 4, 1; 1, 2, 2), B_6(1, 4, 1; 1, 3, 1), B_6(1, 4, 2; 1, 1, 2), B_6(1, 4, 2; 1, 2, 1), B_6(1, 4, 3; 1, 1, 1)$.
- (142) $B_6(1, 5, 1; 1, 1, 2), B_6(1, 5, 1; 1, 2, 1), B_6(1, 5, 2; 1, 1, 1), B_6(1, 6, 1; 1, 1, 1), B_6(2, 1, 1; 1, 1, 5)$.
- (143) $B_6(2, 1, 1; 1, 2, 4), B_6(2, 1, 1; 1, 4, 2), B_6(2, 1, 1; 1, 5, 1), B_6(2, 1, 2; 1, 1, 4), B_6(2, 1, 2; 1, 2, 3)$.
- (144) $B_6(2, 1, 2; 1, 3, 2), B_6(2, 1, 2; 1, 4, 1), B_6(2, 1, 3; 1, 1, 3), B_6(2, 1, 3; 1, 2, 2), B_6(2, 1, 3; 1, 3, 1)$.
- (145) $B_6(2, 1, 3; 2, 1, 2), B_6(2, 1, 4; 1, 1, 2), B_6(2, 1, 4; 1, 2, 1), B_6(2, 1, 4; 2, 1, 1), B_6(2, 1, 5; 1, 1, 1)$.
- (146) $B_6(2, 2, 1; 1, 1, 4), B_6(2, 2, 1; 1, 4, 1), B_6(2, 2, 1; 2, 1, 3), B_6(2, 2, 2; 1, 1, 3), B_6(2, 2, 2; 1, 3, 1)$.

- (147) $B_6(2, 2, 2; 2, 1, 2), B_6(2, 2, 3; 1, 1, 2), B_6(2, 2, 3; 1, 2, 1), B_6(2, 2, 3; 2, 1, 1), B_6(2, 2, 4; 1, 1, 1).$
- (148) $B_6(2, 3, 1; 1, 1, 3), B_6(2, 3, 1; 1, 3, 1), B_6(2, 3, 1; 2, 1, 2), B_6(2, 3, 1; 2, 2, 1), B_6(2, 3, 2; 2, 1, 1).$
- (149) $B_6(2, 3, 3; 1, 1, 1), B_6(2, 4, 1; 1, 1, 2), B_6(2, 4, 1; 1, 2, 1), B_6(2, 4, 1; 2, 1, 1), B_6(2, 4, 2; 1, 1, 1).$
- (150) $B_6(2, 5, 1; 1, 1, 1), B_6(3, 1, 1; 1, 1, 4), B_6(3, 1, 1; 1, 2, 3), B_6(3, 1, 1; 1, 3, 2), B_6(3, 1, 1; 1, 4, 1).$
- (151) $B_6(3, 1, 1; 2, 1, 3), B_6(3, 1, 1; 2, 2, 2), B_6(3, 1, 1; 2, 3, 1), B_6(3, 1, 2; 1, 1, 3), B_6(3, 1, 2; 1, 2, 2).$
- (152) $B_6(3, 1, 2; 1, 3, 1), B_6(3, 1, 2; 2, 1, 2), B_6(3, 1, 2; 2, 2, 1), B_6(3, 1, 3; 1, 1, 2), B_6(3, 1, 3; 1, 2, 1).$
- (153) $B_6(3, 1, 3; 2, 1, 1), B_6(3, 1, 4; 1, 1, 1), B_6(3, 2, 1; 1, 1, 3), B_6(3, 2, 1; 1, 3, 1), B_6(3, 2, 1; 2, 2, 1).$
- (154) $B_6(3, 2, 1; 3, 1, 1), B_6(3, 2, 2; 1, 1, 2), B_6(3, 2, 2; 1, 2, 1), B_6(3, 2, 2; 2, 1, 1), B_6(3, 2, 3; 1, 1, 1).$
- (155) $B_6(3, 3, 1; 2, 1, 1), B_6(3, 3, 2; 1, 1, 1), B_6(3, 4, 1; 1, 1, 1), B_6(4, 1, 1; 1, 1, 3), B_6(4, 1, 1; 1, 2, 2).$
- (156) $B_6(4, 1, 1; 1, 3, 1), B_6(4, 1, 1; 2, 1, 2), B_6(4, 1, 1; 2, 2, 1), B_6(4, 1, 1; 3, 1, 1), B_6(4, 1, 2; 1, 1, 2).$
- (157) $B_6(4, 1, 2; 1, 2, 1), B_6(4, 1, 2; 2, 1, 1), B_6(4, 1, 3; 1, 1, 1), B_6(4, 2, 1; 1, 1, 2), B_6(4, 2, 1; 1, 2, 1).$
- (158) $B_6(4, 2, 1; 2, 1, 1), B_6(4, 2, 2; 1, 1, 1), B_6(4, 3, 1; 1, 1, 1), B_6(5, 1, 1; 1, 1, 2), B_6(5, 1, 1; 1, 2, 1).$
- (159) $B_6(5, 1, 1; 2, 1, 1), B_6(5, 1, 2; 1, 1, 1), B_6(5, 2, 1; 1, 1, 1), B_6(6, 1, 1; 1, 1, 1).$
- (160) $B_6(1, 1, 4; 1, 1, 4), B_6(1, 1, 5; 1, 1, 3), B_6(1, 1, 6; 1, 1, 2), B_6(1, 1, 7; 1, 1, 1), B_6(1, 2, 1; 1, 1, 6).$
- (161) $B_6(1, 2, 2; 1, 1, 5), B_6(1, 2, 3; 1, 1, 4), B_6(1, 2, 5; 1, 1, 2), B_6(1, 2, 5; 1, 2, 1), B_6(1, 2, 6; 1, 1, 1).$
- (162) $B_6(1, 3, 1; 1, 1, 5), B_6(1, 3, 2; 1, 1, 4), B_6(1, 3, 5; 1, 1, 1), B_6(1, 4, 1; 1, 1, 4), B_6(1, 4, 1; 1, 2, 3).$
- (163) $B_6(1, 4, 1; 1, 3, 2), B_6(1, 4, 1; 1, 4, 1), B_6(1, 5, 1; 1, 1, 3), B_6(1, 5, 1; 1, 2, 2), B_6(1, 5, 1; 1, 3, 1).$
- (164) $B_6(1, 5, 2; 1, 1, 2), B_6(1, 5, 2; 1, 2, 1), B_6(1, 5, 3; 1, 1, 1), B_6(1, 6, 1; 1, 1, 2), B_6(1, 6, 1; 1, 2, 1).$
- (165) $B_6(1, 6, 2; 1, 1, 1), B_6(1, 7, 1; 1, 1, 1), B_6(2, 1, 1; 1, 1, 6), B_6(2, 1, 1; 1, 2, 5), B_6(2, 1, 1; 1, 5, 2).$
- (166) $B_6(2, 1, 1; 1, 6, 1), B_6(2, 1, 2; 1, 1, 5), B_6(2, 1, 2; 1, 5, 1), B_6(2, 1, 3; 1, 1, 4), B_6(2, 1, 3; 1, 2, 3).$
- (167) $B_6(2, 1, 3; 1, 3, 2), B_6(2, 1, 3; 1, 4, 1), B_6(2, 1, 3; 2, 1, 3), B_6(2, 1, 4; 1, 1, 3), B_6(2, 1, 4; 1, 2, 2).$
- (168) $B_6(2, 1, 4; 1, 3, 1), B_6(2, 1, 4; 2, 1, 2), B_6(2, 1, 5; 1, 1, 2), B_6(2, 1, 5; 1, 2, 1), B_6(2, 1, 5; 2, 1, 1).$
- (169) $B_6(2, 1, 6; 1, 1, 1), B_6(2, 2, 1; 1, 1, 5), B_6(2, 2, 1; 1, 5, 1), B_6(2, 2, 1; 2, 1, 4), B_6(2, 2, 2; 1, 1, 4).$
- (170) $B_6(2, 2, 2; 1, 4, 1), B_6(2, 2, 2; 2, 1, 3), B_6(2, 2, 3; 2, 1, 2), B_6(2, 2, 4; 1, 1, 2), B_6(2, 2, 4; 1, 2, 1).$
- (171) $B_6(2, 2, 4; 2, 1, 1), B_6(2, 2, 5; 1, 1, 1), B_6(2, 3, 1; 1, 1, 4), B_6(2, 3, 1; 1, 4, 1), B_6(2, 3, 4; 1, 1, 1).$
- (172) $B_6(2, 4, 1; 2, 1, 2), B_6(2, 4, 1; 2, 2, 1), B_6(2, 4, 2; 2, 1, 1), B_6(2, 5, 1; 1, 1, 2), B_6(2, 5, 1; 1, 2, 1).$
- (173) $B_6(2, 5, 1; 2, 1, 1), B_6(2, 5, 2; 1, 1, 1), B_6(2, 6, 1; 1, 1, 1), B_6(3, 1, 1; 1, 1, 5), B_6(3, 1, 1; 1, 5, 1).$
- (174) $B_6(3, 1, 1; 2, 1, 4), B_6(3, 1, 1; 2, 3, 2), B_6(3, 1, 1; 2, 4, 1), B_6(3, 1, 2; 1, 1, 4), B_6(3, 1, 2; 1, 2, 3).$
- (175) $B_6(3, 1, 2; 1, 3, 2), B_6(3, 1, 2; 1, 4, 1), B_6(3, 1, 2; 2, 1, 3), B_6(3, 1, 2; 2, 2, 2), B_6(3, 1, 2; 2, 3, 1).$
- (176) $B_6(3, 1, 3; 1, 1, 3), B_6(3, 1, 3; 1, 2, 2), B_6(3, 1, 3; 1, 3, 1), B_6(3, 1, 3; 2, 1, 2), B_6(3, 1, 4; 1, 1, 2).$
- (177) $B_6(3, 1, 4; 1, 2, 1), B_6(3, 1, 4; 2, 1, 1), B_6(3, 1, 5; 1, 1, 1), B_6(3, 2, 1; 1, 1, 4), B_6(3, 2, 1; 1, 4, 1).$
- (178) $B_6(3, 2, 1; 2, 3, 1), B_6(3, 2, 1; 3, 2, 1), B_6(3, 2, 3; 1, 1, 2), B_6(3, 2, 3; 1, 2, 1), B_6(3, 2, 3; 2, 1, 1).$
- (179) $B_6(3, 2, 4; 1, 1, 1), B_6(3, 3, 1; 3, 1, 1), B_6(3, 3, 2; 2, 1, 1), B_6(3, 3, 3; 1, 1, 1), B_6(3, 4, 1; 2, 1, 1).$
- (180) $B_6(3, 5, 1; 1, 1, 1), B_6(4, 1, 1; 1, 1, 4), B_6(4, 1, 1; 1, 2, 3), B_6(4, 1, 1; 1, 3, 2), B_6(4, 1, 1; 1, 4, 1).$
- (181) $B_6(4, 1, 1; 2, 2, 2), B_6(4, 1, 1; 2, 3, 1), B_6(4, 1, 1; 3, 2, 1), B_6(4, 1, 2; 1, 1, 3), B_6(4, 1, 2; 1, 2, 2).$
- (182) $B_6(4, 1, 2; 1, 3, 1), B_6(4, 1, 2; 2, 2, 1), B_6(4, 1, 3; 1, 1, 2), B_6(4, 1, 3; 1, 2, 1), B_6(4, 1, 4; 1, 1, 1).$

- (183) $B_6(4, 2, 1; 2, 2, 1), B_6(4, 2, 2; 1, 1, 2), B_6(4, 2, 2; 1, 2, 1), B_6(4, 2, 2; 2, 1, 1), B_6(4, 2, 3; 1, 1, 1).$
- (184) $B_6(4, 3, 2; 1, 1, 1), B_6(5, 1, 1; 1, 1, 3), B_6(5, 1, 1; 1, 2, 2), B_6(5, 1, 1; 1, 3, 1), B_6(5, 1, 1; 2, 1, 2).$
- (185) $B_6(5, 1, 1; 2, 2, 1), B_6(5, 1, 1; 3, 1, 1), B_6(5, 1, 2; 1, 1, 2), B_6(5, 1, 2; 1, 2, 1), B_6(5, 1, 2; 2, 1, 1).$
- (186) $B_6(5, 1, 3; 1, 1, 1), B_6(5, 2, 1; 1, 1, 2), B_6(5, 2, 1; 1, 2, 1), B_6(5, 2, 1; 2, 1, 1), B_6(5, 2, 2; 1, 1, 1).$
- (187) $B_6(5, 3, 1; 1, 1, 1), B_6(6, 1, 1; 1, 1, 2), B_6(6, 1, 1; 1, 2, 1), B_6(6, 1, 1; 2, 1, 1), B_6(6, 1, 2; 1, 1, 1).$
- (188) $B_6(6, 2, 1; 1, 1, 1), B_6(7, 1, 1; 1, 1, 1).$
- (189) $B_7(1, 1, 1; 1, 1, 1; 1).$
- (190) $B_7(1, 1, 1; 1, 1, 1; 2), B_7(1, 1, 2; 1, 1, 1; 1), B_7(1, 2, 1; 1, 1, 1; 1), B_7(2, 1, 1; 1, 1, 1; 1).$
- (191) $B_7(1, 1, 1; 1, 1, 1; 3), B_7(1, 1, 2; 1, 1, 1; 2), B_7(1, 1, 2; 1, 1, 2; 1), B_7(1, 1, 3; 1, 1, 1; 1).$
- (192) $B_7(1, 2, 1; 1, 1, 1; 2), B_7(1, 2, 1; 1, 1, 2; 1), B_7(1, 2, 1; 1, 2, 1; 1), B_7(1, 2, 2; 1, 1, 1; 1).$
- (193) $B_7(1, 3, 1; 1, 1, 1; 1), B_7(2, 1, 1; 1, 1, 1; 2), B_7(2, 1, 1; 1, 1, 2; 1), B_7(2, 1, 1; 1, 2, 1; 1).$
- (194) $B_7(2, 1, 1; 2, 1, 1; 1), B_7(2, 1, 2; 1, 1, 1; 1), B_7(2, 2, 1; 1, 1, 1; 1), B_7(3, 1, 1; 1, 1, 1; 1).$
- (195) $B_7(1, 1, 1; 1, 1, 1; 4), B_7(1, 1, 2; 1, 1, 1; 3), B_7(1, 1, 2; 1, 1, 2; 2), B_7(1, 1, 3; 1, 1, 1; 2).$
- (196) $B_7(1, 1, 3; 1, 1, 2; 1), B_7(1, 1, 4; 1, 1, 1; 1), B_7(1, 2, 1; 1, 1, 1; 3), B_7(1, 2, 1; 1, 1, 2; 2).$
- (197) $B_7(1, 2, 1; 1, 1, 3; 1), B_7(1, 2, 1; 1, 2, 1; 2), B_7(1, 2, 2; 1, 1, 1; 2), B_7(1, 2, 2; 1, 1, 2; 1).$
- (198) $B_7(1, 2, 2; 1, 2, 1; 1), B_7(1, 2, 3; 1, 1, 1; 1), B_7(1, 3, 1; 1, 1, 1; 2), B_7(1, 3, 1; 1, 1, 2; 1).$
- (199) $B_7(1, 3, 1; 1, 2, 1; 1), B_7(1, 3, 2; 1, 1, 1; 1), B_7(1, 4, 1; 1, 1, 1; 1), B_7(2, 1, 1; 1, 1, 1; 3).$
- (200) $B_7(2, 1, 1; 1, 1, 2; 2), B_7(2, 1, 1; 1, 1, 3; 1), B_7(2, 1, 1; 1, 2, 1; 2), B_7(2, 1, 1; 1, 2, 2; 1).$
- (201) $B_7(2, 1, 1; 1, 3, 1; 1), B_7(2, 1, 1; 2, 1, 1; 2), B_7(2, 1, 2; 1, 1, 1; 2), B_7(2, 1, 2; 1, 1, 2; 1).$
- (202) $B_7(2, 1, 2; 1, 2, 1; 1), B_7(2, 1, 3; 1, 1, 1; 1), B_7(2, 2, 1; 1, 1, 1; 2), B_7(2, 2, 1; 1, 2, 1; 1).$
- (203) $B_7(2, 2, 1; 2, 1, 1; 1), B_7(2, 2, 2; 1, 1, 1; 1), B_7(2, 3, 1; 1, 1, 1; 1), B_7(3, 1, 1; 1, 1, 1; 2).$
- (204) $B_7(3, 1, 1; 1, 1, 2; 1), B_7(3, 1, 1; 1, 2, 1; 1), B_7(3, 1, 1; 2, 1, 1; 1), B_7(3, 1, 2; 1, 1, 1; 1).$
- (205) $B_7(3, 2, 1; 1, 1, 1; 1), B_7(4, 1, 1; 1, 1, 1; 1).$
- (206) $B_7(1, 1, 1; 1, 1, 1; 5), B_7(1, 1, 2; 1, 1, 1; 4), B_7(1, 1, 2; 1, 1, 2; 3), B_7(1, 1, 3; 1, 1, 1; 3).$
- (207) $B_7(1, 1, 3; 1, 1, 2; 2), B_7(1, 1, 3; 1, 1, 3; 1), B_7(1, 1, 4; 1, 1, 1; 2), B_7(1, 1, 4; 1, 1, 2; 1).$
- (208) $B_7(1, 1, 5; 1, 1, 1; 1), B_7(1, 2, 1; 1, 1, 1; 4), B_7(1, 2, 1; 1, 1, 2; 3), B_7(1, 2, 1; 1, 1, 4; 1).$
- (209) $B_7(1, 2, 1; 1, 2, 1; 3), B_7(1, 2, 2; 1, 1, 1; 3), B_7(1, 2, 2; 1, 1, 2; 2), B_7(1, 2, 2; 1, 1, 3; 1).$
- (210) $B_7(1, 2, 2; 1, 2, 1; 2), B_7(1, 2, 3; 1, 1, 1; 2), B_7(1, 2, 3; 1, 1, 2; 1), B_7(1, 2, 4; 1, 1, 1; 1).$
- (211) $B_7(1, 3, 1; 1, 1, 1; 3), B_7(1, 3, 1; 1, 1, 2; 2), B_7(1, 3, 1; 1, 1, 3; 1), B_7(1, 3, 1; 1, 2, 1; 2).$
- (212) $B_7(1, 3, 1; 1, 2, 2; 1), B_7(1, 3, 1; 1, 3, 1; 1), B_7(1, 3, 2; 1, 1, 1; 2), B_7(1, 3, 2; 1, 1, 2; 1).$
- (213) $B_7(1, 3, 2; 1, 2, 1; 1), B_7(1, 3, 3; 1, 1, 1; 1), B_7(1, 4, 1; 1, 1, 1; 2), B_7(1, 4, 1; 1, 1, 2; 1).$
- (214) $B_7(1, 4, 1; 1, 2, 1; 1), B_7(1, 4, 2; 1, 1, 1; 1), B_7(1, 5, 1; 1, 1, 1; 1), B_7(2, 1, 1; 1, 1, 1; 4).$
- (215) $B_7(2, 1, 1; 1, 1, 2; 3), B_7(2, 1, 1; 1, 1, 4; 1), B_7(2, 1, 1; 1, 2, 1; 3), B_7(2, 1, 1; 1, 2, 2; 2).$
- (216) $B_7(2, 1, 1; 1, 3, 1; 2), B_7(2, 1, 1; 1, 3, 2; 1), B_7(2, 1, 1; 1, 4, 1; 1), B_7(2, 1, 1; 2, 1, 1; 3).$
- (217) $B_7(2, 1, 2; 1, 1, 1; 3), B_7(2, 1, 2; 1, 1, 3; 1), B_7(2, 1, 2; 1, 2, 1; 2), B_7(2, 1, 2; 1, 2, 2; 1).$
- (218) $B_7(2, 1, 2; 1, 3, 1; 1), B_7(2, 1, 3; 1, 1, 2; 1), B_7(2, 1, 3; 1, 2, 1; 1), B_7(2, 1, 4; 1, 1, 1; 1).$

- (219) $B_7(2, 2, 1; 1, 1, 1; 3)$, $B_7(2, 2, 1; 1, 2, 1; 2)$, $B_7(2, 2, 1; 1, 3, 1; 1)$, $B_7(2, 2, 1; 2, 1, 1; 2)$.
- (220) $B_7(2, 2, 1; 2, 2, 1; 1)$, $B_7(2, 2, 2; 1, 1, 1; 2)$, $B_7(2, 2, 2; 1, 2, 1; 1)$, $B_7(2, 2, 3; 1, 1, 1; 1)$.
- (221) $B_7(2, 3, 1; 1, 1, 1; 2)$, $B_7(2, 3, 1; 1, 2, 1; 1)$, $B_7(2, 3, 1; 2, 1, 1; 1)$, $B_7(2, 3, 2; 1, 1, 1; 1)$.
- (222) $B_7(2, 4, 1; 1, 1, 1; 1)$, $B_7(3, 1, 1; 1, 1, 1; 3)$, $B_7(3, 1, 1; 1, 1, 2; 2)$, $B_7(3, 1, 1; 1, 1, 3; 1)$.
- (223) $B_7(3, 1, 1; 1, 2, 1; 2)$, $B_7(3, 1, 1; 1, 2, 2; 1)$, $B_7(3, 1, 1; 1, 3, 1; 1)$, $B_7(3, 1, 1; 2, 1, 1; 2)$.
- (224) $B_7(3, 1, 1; 2, 2, 1; 1)$, $B_7(3, 1, 2; 1, 1, 1; 2)$, $B_7(3, 1, 2; 1, 1, 2; 1)$, $B_7(3, 1, 2; 1, 2, 1; 1)$.
- (225) $B_7(3, 1, 3; 1, 1, 1; 1)$, $B_7(3, 2, 1; 1, 1, 1; 2)$, $B_7(3, 2, 1; 1, 2, 1; 1)$, $B_7(3, 2, 2; 1, 1, 1; 1)$.
- (226) $B_7(4, 1, 1; 1, 1, 1; 2)$, $B_7(4, 1, 1; 1, 1, 2; 1)$, $B_7(4, 1, 1; 1, 2, 1; 1)$, $B_7(4, 1, 1; 2, 1, 1; 1)$.
- (227) $B_7(4, 1, 2; 1, 1, 1; 1)$, $B_7(4, 2, 1; 1, 1, 1; 1)$, $B_7(5, 1, 1; 1, 1, 1; 1)$.
- (228) $B_7(1, 1, 1; 1, 1, 1; 6)$, $B_7(1, 1, 2; 1, 1, 1; 5)$, $B_7(1, 1, 2; 1, 1, 2; 4)$, $B_7(1, 1, 3; 1, 1, 1; 4)$.
- (229) $B_7(1, 1, 3; 1, 1, 3; 2)$, $B_7(1, 1, 4; 1, 1, 2; 2)$, $B_7(1, 1, 4; 1, 1, 3; 1)$, $B_7(1, 1, 5; 1, 1, 1; 2)$.
- (230) $B_7(1, 1, 5; 1, 1, 2; 1)$, $B_7(1, 1, 6; 1, 1, 1; 1)$, $B_7(1, 2, 1; 1, 1, 1; 5)$, $B_7(1, 2, 1; 1, 1, 2; 4)$.
- (231) $B_7(1, 2, 1; 1, 1, 5; 1)$, $B_7(1, 2, 1; 1, 2, 1; 4)$, $B_7(1, 2, 2; 1, 1, 1; 4)$, $B_7(1, 2, 2; 1, 1, 2; 3)$.
- (232) $B_7(1, 2, 2; 1, 1, 4; 1)$, $B_7(1, 2, 2; 1, 2, 1; 3)$, $B_7(1, 2, 3; 1, 1, 1; 3)$, $B_7(1, 2, 3; 1, 1, 2; 2)$.
- (233) $B_7(1, 2, 3; 1, 1, 3; 1)$, $B_7(1, 2, 4; 1, 1, 2; 1)$, $B_7(1, 2, 5; 1, 1, 1; 1)$, $B_7(1, 3, 1; 1, 1, 1; 4)$.
- (234) $B_7(1, 3, 1; 1, 2, 1; 3)$, $B_7(1, 3, 1; 1, 3, 1; 2)$, $B_7(1, 3, 2; 1, 1, 1; 3)$, $B_7(1, 3, 2; 1, 1, 2; 2)$.
- (235) $B_7(1, 3, 2; 1, 2, 1; 2)$, $B_7(1, 3, 3; 1, 1, 1; 2)$, $B_7(1, 4, 1; 1, 1, 1; 3)$, $B_7(1, 4, 1; 1, 1, 2; 2)$.
- (236) $B_7(1, 4, 1; 1, 1, 3; 1)$, $B_7(1, 4, 1; 1, 2, 1; 2)$, $B_7(1, 4, 1; 1, 2, 2; 1)$, $B_7(1, 4, 1; 1, 3, 1; 1)$.
- (237) $B_7(1, 4, 2; 1, 1, 1; 2)$, $B_7(1, 4, 2; 1, 1, 2; 1)$, $B_7(1, 4, 2; 1, 2, 1; 1)$, $B_7(1, 4, 3; 1, 1, 1; 1)$.
- (238) $B_7(1, 5, 1; 1, 1, 1; 2)$, $B_7(1, 5, 1; 1, 1, 2; 1)$, $B_7(1, 5, 1; 1, 2, 1; 1)$, $B_7(1, 5, 2; 1, 1, 1; 1)$.
- (239) $B_7(1, 6, 1; 1, 1, 1; 1)$, $B_7(2, 1, 1; 1, 1, 1; 5)$, $B_7(2, 1, 1; 1, 1, 2; 4)$, $B_7(2, 1, 1; 1, 1, 5; 1)$.
- (240) $B_7(2, 1, 1; 1, 2, 1; 4)$, $B_7(2, 1, 1; 1, 2, 2; 3)$, $B_7(2, 1, 1; 1, 3, 1; 3)$, $B_7(2, 1, 1; 1, 3, 2; 2)$.
- (241) $B_7(2, 1, 1; 1, 4, 1; 2)$, $B_7(2, 1, 1; 1, 4, 2; 1)$, $B_7(2, 1, 1; 1, 5, 1; 1)$, $B_7(2, 1, 1; 2, 1, 1; 4)$.
- (242) $B_7(2, 1, 2; 1, 1, 1; 4)$, $B_7(2, 1, 2; 1, 1, 4; 1)$, $B_7(2, 1, 2; 1, 3, 1; 2)$, $B_7(2, 1, 2; 1, 3, 2; 1)$.
- (243) $B_7(2, 1, 2; 1, 4, 1; 1)$, $B_7(2, 1, 3; 1, 1, 3; 1)$, $B_7(2, 1, 3; 1, 2, 2; 1)$, $B_7(2, 1, 3; 1, 3, 1; 1)$.
- (244) $B_7(2, 1, 4; 1, 1, 2; 1)$, $B_7(2, 1, 5; 1, 1, 1; 1)$, $B_7(2, 2, 1; 1, 1, 1; 4)$, $B_7(2, 2, 1; 1, 2, 1; 3)$.
- (245) $B_7(2, 2, 1; 1, 3, 1; 2)$, $B_7(2, 2, 1; 1, 4, 1; 1)$, $B_7(2, 2, 1; 2, 1, 1; 3)$, $B_7(2, 2, 1; 2, 2, 1; 2)$.
- (246) $B_7(2, 2, 2; 1, 1, 1; 3)$, $B_7(2, 2, 2; 1, 2, 1; 2)$, $B_7(2, 2, 2; 1, 3, 1; 1)$, $B_7(2, 2, 4; 1, 1, 1; 1)$.
- (247) $B_7(2, 3, 1; 1, 1, 1; 3)$, $B_7(2, 3, 1; 1, 2, 1; 2)$, $B_7(2, 3, 1; 1, 3, 1; 1)$, $B_7(2, 3, 1; 2, 2, 1; 1)$.
- (248) $B_7(2, 3, 2; 1, 1, 1; 2)$, $B_7(2, 3, 3; 1, 1, 1; 1)$, $B_7(2, 4, 1; 2, 1, 1; 1)$, $B_7(2, 4, 2; 1, 1, 1; 1)$.
- (249) $B_7(2, 5, 1; 1, 1, 1; 1)$, $B_7(3, 1, 1; 1, 1, 1; 4)$, $B_7(3, 1, 1; 1, 2, 1; 3)$, $B_7(3, 1, 1; 1, 3, 1; 2)$.
- (250) $B_7(3, 1, 1; 1, 4, 1; 1)$, $B_7(3, 1, 1; 2, 1, 1; 3)$, $B_7(3, 1, 1; 2, 3, 1; 1)$, $B_7(3, 1, 2; 1, 2, 1; 2)$.
- (251) $B_7(3, 1, 2; 1, 2, 2; 1)$, $B_7(3, 1, 2; 1, 3, 1; 1)$, $B_7(3, 1, 3; 1, 2, 1; 1)$, $B_7(3, 2, 1; 1, 1, 1; 3)$.
- (252) $B_7(3, 2, 1; 1, 2, 1; 2)$, $B_7(3, 2, 1; 1, 3, 1; 1)$, $B_7(3, 2, 2; 1, 2, 1; 1)$, $B_7(3, 2, 3; 1, 1, 1; 1)$.
- (253) $B_7(4, 1, 1; 1, 1, 1; 3)$, $B_7(4, 1, 1; 1, 1, 2; 2)$, $B_7(4, 1, 1; 1, 1, 3; 1)$, $B_7(4, 1, 1; 1, 2, 1; 2)$.
- (254) $B_7(4, 1, 1; 1, 2, 2; 1)$, $B_7(4, 1, 1; 1, 3, 1; 1)$, $B_7(4, 1, 1; 2, 2, 1; 1)$, $B_7(4, 1, 2; 1, 1, 1; 2)$.

- (255) $B_7(4, 1, 2; 1, 1, 2; 1), B_7(4, 1, 2; 1, 2, 1; 1), B_7(4, 1, 3; 1, 1, 1; 1), B_7(4, 2, 2; 1, 1, 1; 1)$.
- (256) $B_7(5, 1, 1; 1, 1, 1; 2), B_7(5, 1, 1; 1, 1, 2; 1), B_7(5, 1, 1; 1, 2, 1; 1), B_7(5, 1, 1; 2, 1, 1; 1)$.
- (257) $B_7(5, 1, 2; 1, 1, 1; 1), B_7(5, 2, 1; 1, 1, 1; 1), B_7(6, 1, 1; 1, 1, 1; 1)$.
- (258) $B_8(1, 1, 1, 1; 1, 1, 1, 1)$.
- (259) $B_8(1, 1, 1, 2; 1, 1, 1, 1), B_8(1, 1, 2, 1; 1, 1, 1, 1), B_8(1, 2, 1, 1; 1, 1, 1, 1), B_8(2, 1, 1, 1; 1, 1, 1, 1)$.
- (260) $B_8(1, 1, 1, 2; 1, 1, 1, 2), B_8(1, 1, 1, 3; 1, 1, 1, 1), B_8(1, 1, 2, 1; 1, 1, 1, 2), B_8(1, 1, 2, 1; 1, 1, 2, 1)$.
- (261) $B_8(1, 1, 2, 2; 1, 1, 1, 1), B_8(1, 1, 3, 1; 1, 1, 1, 1), B_8(1, 2, 1, 1; 1, 1, 1, 2), B_8(1, 2, 1, 1; 1, 1, 2, 1)$.
- (262) $B_8(1, 2, 1, 1; 1, 2, 1, 1), B_8(1, 2, 1, 2; 1, 1, 1, 1), B_8(1, 2, 2, 1; 1, 1, 1, 1), B_8(1, 3, 1, 1; 1, 1, 1, 1)$.
- (263) $B_8(2, 1, 1, 1; 1, 1, 1, 2), B_8(2, 1, 1, 1; 1, 1, 2, 1), B_8(2, 1, 1, 1; 1, 2, 1, 1), B_8(2, 1, 1, 1; 2, 1, 1, 1)$.
- (264) $B_8(2, 1, 1, 2; 1, 1, 1, 1), B_8(2, 1, 2, 1; 1, 1, 1, 1), B_8(2, 2, 1, 1; 1, 1, 1, 1), B_8(3, 1, 1, 1; 1, 1, 1, 1)$.
- (265) $B_8(1, 1, 1, 3; 1, 1, 1, 2), B_8(1, 1, 1, 4; 1, 1, 1, 1), B_8(1, 1, 2, 1; 1, 1, 1, 3), B_8(1, 1, 2, 2; 1, 1, 1, 2)$.
- (266) $B_8(1, 1, 2, 2; 1, 1, 2, 1), B_8(1, 1, 2, 3; 1, 1, 1, 1), B_8(1, 1, 3, 1; 1, 1, 1, 2), B_8(1, 1, 3, 1; 1, 1, 2, 1)$.
- (267) $B_8(1, 1, 3, 2; 1, 1, 1, 1), B_8(1, 1, 4, 1; 1, 1, 1, 1), B_8(1, 2, 1, 1; 1, 1, 1, 3), B_8(1, 2, 1, 1; 1, 1, 3, 1)$.
- (268) $B_8(1, 2, 1, 2; 1, 1, 2, 1), B_8(1, 2, 1, 2; 1, 2, 1, 1), B_8(1, 2, 1, 3; 1, 1, 1, 1), B_8(1, 2, 2, 1; 1, 1, 1, 2)$.
- (269) $B_8(1, 2, 2, 1; 1, 2, 1, 1), B_8(1, 2, 2, 2; 1, 1, 1, 1), B_8(1, 2, 3, 1; 1, 1, 1, 1), B_8(1, 3, 1, 1; 1, 1, 1, 2)$.
- (270) $B_8(1, 3, 1, 1; 1, 1, 2, 1), B_8(1, 3, 1, 1; 1, 2, 1, 1), B_8(1, 3, 1, 2; 1, 1, 1, 1), B_8(1, 3, 2, 1; 1, 1, 1, 1)$.
- (271) $B_8(1, 4, 1, 1; 1, 1, 1, 1), B_8(2, 1, 1, 1; 1, 1, 1, 3), B_8(2, 1, 1, 1; 1, 1, 2, 2), B_8(2, 1, 1, 1; 1, 1, 3, 1)$.
- (272) $B_8(2, 1, 1, 1; 1, 2, 2, 1), B_8(2, 1, 1, 1; 1, 3, 1, 1), B_8(2, 1, 1, 2; 1, 1, 1, 2), B_8(2, 1, 1, 2; 1, 1, 2, 1)$.
- (273) $B_8(2, 1, 1, 2; 1, 2, 1, 1), B_8(2, 1, 1, 2; 2, 1, 1, 1), B_8(2, 1, 1, 3; 1, 1, 1, 1), B_8(2, 1, 2, 1; 1, 1, 1, 2)$.
- (274) $B_8(2, 1, 2, 1; 1, 1, 2, 1), B_8(2, 1, 2, 1; 2, 1, 1, 1), B_8(2, 1, 2, 2; 1, 1, 1, 1), B_8(2, 1, 3, 1; 1, 1, 1, 1)$.
- (275) $B_8(2, 2, 1, 1; 1, 1, 2, 1), B_8(2, 2, 1, 1; 1, 2, 1, 1), B_8(2, 2, 1, 1; 2, 1, 1, 1), B_8(2, 2, 1, 2; 1, 1, 1, 1)$.
- (276) $B_8(2, 2, 2, 1; 1, 1, 1, 1), B_8(2, 3, 1, 1; 1, 1, 1, 1), B_8(3, 1, 1, 1; 1, 1, 1, 2), B_8(3, 1, 1, 1; 1, 1, 2, 1)$.
- (277) $B_8(3, 1, 1, 1; 1, 2, 1, 1), B_8(3, 1, 1, 1; 2, 1, 1, 1), B_8(3, 1, 1, 2; 1, 1, 1, 1), B_8(3, 1, 2, 1; 1, 1, 1, 1)$.
- (278) $B_8(3, 2, 1, 1; 1, 1, 1, 1), B_8(4, 1, 1, 1; 1, 1, 1, 1)$.
- (279) $B_8(1, 1, 1, 4; 1, 1, 1, 2), B_8(1, 1, 1, 5; 1, 1, 1, 1), B_8(1, 1, 2, 1; 1, 1, 1, 4), B_8(1, 1, 2, 2; 1, 1, 1, 3)$.
- (280) $B_8(1, 1, 2, 2; 1, 1, 2, 2), B_8(1, 1, 2, 3; 1, 1, 2, 1), B_8(1, 1, 2, 4; 1, 1, 1, 1), B_8(1, 1, 3, 1; 1, 1, 1, 3)$.
- (281) $B_8(1, 1, 3, 1; 1, 1, 2, 2), B_8(1, 1, 3, 2; 1, 1, 1, 2), B_8(1, 1, 4, 1; 1, 1, 1, 2), B_8(1, 1, 4, 1; 1, 1, 2, 1)$.
- (282) $B_8(1, 1, 4, 2; 1, 1, 1, 1), B_8(1, 1, 5, 1; 1, 1, 1, 1), B_8(1, 2, 1, 1; 1, 1, 1, 4), B_8(1, 2, 1, 1; 1, 1, 4, 1)$.
- (283) $B_8(1, 2, 1, 2; 1, 1, 3, 1), B_8(1, 2, 1, 3; 1, 1, 2, 1), B_8(1, 2, 1, 4; 1, 1, 1, 1), B_8(1, 2, 2, 1; 1, 1, 1, 3)$.
- (284) $B_8(1, 2, 2, 1; 1, 2, 1, 2), B_8(1, 2, 2, 3; 1, 1, 1, 1), B_8(1, 2, 3, 1; 1, 1, 1, 2), B_8(1, 2, 3, 2; 1, 1, 1, 1)$.
- (285) $B_8(1, 2, 4, 1; 1, 1, 1, 1), B_8(1, 3, 1, 1; 1, 2, 1, 2), B_8(1, 3, 1, 1; 1, 2, 2, 1), B_8(1, 3, 1, 1; 1, 3, 1, 1)$.
- (286) $B_8(1, 3, 1, 2; 1, 2, 1, 1), B_8(1, 3, 2, 1; 1, 2, 1, 1), B_8(1, 3, 2, 2; 1, 1, 1, 1), B_8(1, 4, 1, 1; 1, 1, 1, 2)$.
- (287) $B_8(1, 4, 1, 1; 1, 1, 2, 1), B_8(1, 4, 1, 1; 1, 2, 1, 1), B_8(1, 4, 1, 2; 1, 1, 1, 1), B_8(1, 4, 2, 1; 1, 1, 1, 1)$.
- (288) $B_8(1, 5, 1, 1; 1, 1, 1, 1), B_8(2, 1, 1, 1; 1, 1, 1, 4), B_8(2, 1, 1, 1; 1, 1, 3, 2), B_8(2, 1, 1, 1; 1, 1, 4, 1)$.
- (289) $B_8(2, 1, 1, 1; 1, 2, 3, 1), B_8(2, 1, 1, 1; 1, 4, 1, 1), B_8(2, 1, 1, 2; 1, 1, 2, 2), B_8(2, 1, 1, 2; 1, 1, 3, 1)$.
- (290) $B_8(2, 1, 1, 2; 1, 2, 2, 1), B_8(2, 1, 1, 2; 2, 1, 1, 2), B_8(2, 1, 1, 3; 1, 1, 1, 2), B_8(2, 1, 1, 3; 1, 1, 2, 1)$.

- (291) $B_8(2, 1, 1, 3; 1, 2, 1, 1), B_8(2, 1, 1, 3; 2, 1, 1, 1), B_8(2, 1, 1, 4; 1, 1, 1, 1), B_8(2, 1, 2, 1; 1, 1, 1, 3).$
- (292) $B_8(2, 1, 2, 1; 1, 1, 2, 2), B_8(2, 1, 2, 1; 1, 1, 3, 1), B_8(2, 1, 2, 1; 2, 1, 1, 2), B_8(2, 1, 2, 2; 1, 1, 2, 1).$
- (293) $B_8(2, 1, 2, 2; 2, 1, 1, 1), B_8(2, 1, 2, 3; 1, 1, 1, 1), B_8(2, 1, 3, 1; 1, 1, 1, 2), B_8(2, 1, 3, 1; 2, 1, 1, 1).$
- (294) $B_8(2, 1, 4, 1; 1, 1, 1, 1), B_8(2, 2, 1, 1; 1, 1, 3, 1), B_8(2, 2, 1, 1; 1, 2, 2, 1), B_8(2, 2, 1, 1; 1, 3, 1, 1).$
- (295) $B_8(2, 2, 1, 1; 2, 2, 1, 1), B_8(2, 2, 1, 2; 1, 1, 2, 1), B_8(2, 2, 1, 3; 1, 1, 1, 1), B_8(2, 2, 2, 1; 2, 1, 1, 1).$
- (296) $B_8(2, 2, 2, 2; 1, 1, 1, 1), B_8(2, 2, 3, 1; 1, 1, 1, 1), B_8(2, 3, 1, 1; 1, 2, 1, 1), B_8(2, 3, 1, 1; 2, 1, 1, 1).$
- (297) $B_8(2, 3, 2, 1; 1, 1, 1, 1), B_8(2, 4, 1, 1; 1, 1, 1, 1), B_8(3, 1, 1, 1; 1, 1, 2, 2), B_8(3, 1, 1, 1; 1, 1, 3, 1).$
- (298) $B_8(3, 1, 1, 1; 1, 2, 2, 1), B_8(3, 1, 1, 1; 2, 1, 2, 1), B_8(3, 1, 1, 1; 2, 2, 1, 1), B_8(3, 1, 1, 2; 1, 1, 1, 2).$
- (299) $B_8(3, 1, 1, 2; 1, 1, 2, 1), B_8(3, 1, 1, 2; 1, 2, 1, 1), B_8(3, 1, 1, 2; 2, 1, 1, 1), B_8(3, 1, 1, 3; 1, 1, 1, 1).$
- (300) $B_8(3, 1, 2, 1; 1, 1, 2, 1), B_8(3, 1, 2, 2; 1, 1, 1, 1), B_8(3, 2, 1, 1; 1, 1, 2, 1), B_8(3, 2, 1, 1; 2, 1, 1, 1).$
- (301) $B_8(3, 2, 1, 2; 1, 1, 1, 1), B_8(3, 2, 2, 1; 1, 1, 1, 1), B_8(4, 1, 1, 1; 1, 1, 1, 2), B_8(4, 1, 1, 1; 1, 1, 2, 1).$
- (302) $B_8(4, 1, 1, 1; 1, 2, 1, 1), B_8(4, 1, 1, 1; 2, 1, 1, 1), B_8(4, 1, 1, 2; 1, 1, 1, 1), B_8(4, 1, 2, 1; 1, 1, 1, 1).$
- (303) $B_8(4, 2, 1, 1; 1, 1, 1, 1), B_8(5, 1, 1, 1; 1, 1, 1, 1).$
- (304) $B_9(1, 1, 1, 1; 1, 1, 1, 1; 1).$
- (305) $B_9(1, 1, 1, 1; 1, 1, 1, 1; 2), B_9(1, 1, 1, 2; 1, 1, 1, 1; 1), B_9(1, 1, 2, 1; 1, 1, 1, 1; 1).$
- (306) $B_9(1, 2, 1, 1; 1, 1, 1, 1; 1), B_9(2, 1, 1, 1; 1, 1, 1, 1; 1).$
- (307) $B_9(1, 1, 1, 1; 1, 1, 1, 1; 3), B_9(1, 1, 1, 2; 1, 1, 1, 1; 2), B_9(1, 1, 1, 2; 1, 1, 1, 2; 1).$
- (308) $B_9(1, 1, 1, 3; 1, 1, 1, 1; 1), B_9(1, 1, 2, 1; 1, 1, 1, 1; 2), B_9(1, 1, 2, 1; 1, 1, 1, 2; 1).$
- (309) $B_9(1, 1, 2, 2; 1, 1, 1, 1; 1), B_9(1, 1, 3, 1; 1, 1, 1, 1; 1), B_9(1, 2, 1, 1; 1, 1, 1, 1; 2).$
- (310) $B_9(1, 2, 1, 1; 1, 1, 1, 2; 1), B_9(1, 2, 1, 1; 1, 1, 2, 1; 1), B_9(1, 2, 1, 1; 1, 2, 1, 1; 1).$
- (311) $B_9(1, 2, 1, 2; 1, 1, 1, 1; 1), B_9(1, 2, 2, 1; 1, 1, 1, 1; 1), B_9(1, 3, 1, 1; 1, 1, 1, 1; 1).$
- (312) $B_9(2, 1, 1, 1; 1, 1, 1, 1; 2), B_9(2, 1, 1, 1; 1, 1, 2, 1; 1), B_9(2, 1, 1, 1; 1, 2, 1, 1; 1).$
- (313) $B_9(2, 1, 1, 2; 1, 1, 1, 1; 1), B_9(2, 2, 1, 1; 1, 1, 1, 1; 1), B_9(3, 1, 1, 1; 1, 1, 1, 1; 1).$
- (314) $B_9(1, 1, 1, 1; 1, 1, 1, 1; 4), B_9(1, 1, 1, 2; 1, 1, 1, 1; 3), B_9(1, 1, 1, 2; 1, 1, 1, 2; 2).$
- (315) $B_9(1, 1, 1, 3; 1, 1, 1, 2; 1), B_9(1, 1, 1, 4; 1, 1, 1, 1; 1), B_9(1, 1, 2, 1; 1, 1, 1, 1; 3).$
- (316) $B_9(1, 1, 2, 1; 1, 1, 1, 3; 1), B_9(1, 1, 2, 2; 1, 1, 1, 1; 2), B_9(1, 1, 2, 2; 1, 1, 1, 2; 1).$
- (317) $B_9(1, 1, 2, 3; 1, 1, 1, 1; 1), B_9(1, 1, 3, 1; 1, 1, 1, 2; 1), B_9(1, 1, 3, 2; 1, 1, 1, 1; 1).$
- (318) $B_9(1, 1, 4, 1; 1, 1, 1, 1; 1), B_9(1, 2, 1, 1; 1, 1, 1, 1; 3), B_9(1, 2, 1, 1; 1, 1, 1, 2; 2).$
- (319) $B_9(1, 2, 1, 1; 1, 1, 2, 1; 2), B_9(1, 2, 1, 1; 1, 2, 1, 1; 2), B_9(1, 2, 1, 2; 1, 1, 1, 1; 2).$
- (320) $B_9(1, 2, 1, 2; 1, 2, 1, 1; 1), B_9(1, 2, 2, 1; 1, 1, 1, 1; 2), B_9(1, 2, 2, 1; 1, 1, 1, 2; 1).$
- (321) $B_9(1, 2, 2, 1; 1, 2, 1, 1; 1), B_9(1, 2, 2, 2; 1, 1, 1, 1; 1), B_9(1, 3, 1, 1; 1, 1, 1, 1; 2).$
- (322) $B_9(1, 3, 1, 1; 1, 1, 1, 2; 1), B_9(1, 3, 1, 1; 1, 1, 2, 1; 1), B_9(1, 3, 1, 1; 1, 2, 1, 1; 1).$
- (323) $B_9(1, 3, 1, 2; 1, 1, 1, 1; 1), B_9(1, 3, 2, 1; 1, 1, 1, 1; 1), B_9(1, 4, 1, 1; 1, 1, 1, 1; 1).$
- (324) $B_9(2, 1, 1, 1; 1, 1, 1, 1; 3), B_9(2, 1, 1, 1; 1, 1, 3, 1; 1), B_9(2, 1, 1, 1; 1, 2, 1, 1; 2).$
- (325) $B_9(2, 1, 1, 1; 1, 3, 1, 1; 1), B_9(2, 1, 1, 2; 1, 1, 2, 1; 1), B_9(2, 1, 1, 2; 1, 2, 1, 1; 1).$
- (326) $B_9(2, 1, 1, 3; 1, 1, 1, 1; 1), B_9(2, 2, 1, 1; 1, 1, 1, 1; 2), B_9(2, 2, 1, 1; 1, 1, 2, 1; 1).$

- (327) $B_9(2, 2, 1, 1; 1, 2, 1, 1; 1), B_9(2, 2, 1, 2; 1, 1, 1, 1; 1), B_9(2, 3, 1, 1; 1, 1, 1, 1; 1).$
- (328) $B_9(3, 1, 1, 1; 1, 1, 2, 1; 1), B_9(3, 1, 1, 2; 1, 1, 1, 1; 1), B_9(4, 1, 1, 1; 1, 1, 1, 1; 1).$
- (329) $B_{10}(1, 1, 1, 1, 1; 1, 1, 1, 1, 1).$
- (330) $B_{10}(1, 1, 1, 1, 2; 1, 1, 1, 1, 1), B_{10}(1, 1, 1, 2, 1; 1, 1, 1, 1, 1), B_{10}(1, 1, 2, 1, 1; 1, 1, 1, 1, 1).$
- (331) $B_{10}(1, 2, 1, 1, 1; 1, 1, 1, 1, 1), B_{10}(2, 1, 1, 1, 1; 1, 1, 1, 1, 1).$
- (332) $B_{10}(1, 1, 1, 1, 3; 1, 1, 1, 1, 1), B_{10}(1, 1, 1, 2, 1; 1, 1, 1, 1, 2), B_{10}(1, 1, 1, 2, 1; 1, 1, 1, 2, 1).$
- (333) $B_{10}(1, 1, 1, 2, 2; 1, 1, 1, 1, 1), B_{10}(1, 1, 1, 3, 1; 1, 1, 1, 1, 1), B_{10}(1, 1, 2, 1, 1; 1, 1, 1, 1, 2).$
- (334) $B_{10}(1, 1, 2, 2, 1; 1, 1, 1, 1, 1), B_{10}(1, 1, 3, 1, 1; 1, 1, 1, 1, 1), B_{10}(1, 2, 1, 1, 1; 1, 1, 2, 1, 1).$
- (335) $B_{10}(1, 2, 1, 1, 1; 1, 2, 1, 1, 1), B_{10}(1, 2, 1, 1, 2; 1, 1, 1, 1, 1), B_{10}(1, 2, 2, 1, 1; 1, 1, 1, 1, 1).$
- (336) $B_{10}(1, 3, 1, 1, 1; 1, 1, 1, 1, 1), B_{10}(2, 1, 1, 1, 1; 1, 1, 1, 2, 1), B_{10}(2, 1, 1, 1, 1; 1, 1, 2, 1, 1).$
- (337) $B_{10}(2, 1, 1, 1, 1; 2, 1, 1, 1, 1), B_{10}(2, 1, 1, 1, 2; 1, 1, 1, 1, 1), B_{10}(2, 1, 1, 2, 1; 1, 1, 1, 1, 1).$
- (338) $B_{10}(2, 2, 1, 1, 1; 1, 1, 1, 1, 1), B_{10}(3, 1, 1, 1, 1; 1, 1, 1, 1, 1).$
- (339) $B_{11}(1, 1, 1, 1, 1; 1, 1, 1, 1, 1; 1).$
- (340) $B_{11}(1, 1, 1, 1, 1; 1, 1, 1, 1, 1; 2), B_{11}(1, 1, 1, 1, 2; 1, 1, 1, 1, 1; 1).$
- (341) $B_{11}(1, 1, 2, 1, 1; 1, 1, 1, 1, 1; 1), B_{11}(1, 2, 1, 1, 1; 1, 1, 1, 1, 1; 1).$
- (342) $B_{12}(1, 1, 1, 1, 1, 1; 1, 1, 1, 1, 1, 1).$

Proof. One can check that for every 1575 above graphs G , $\lambda_1(G) > 0$, $\lambda_2(G) > 0$ and $\lambda_3(G) < 0$. Now assume that G is a connected graph of order n such that $\lambda_1(G) > 0$, $\lambda_2(G) > 0$ and $\lambda_3(G) < 0$. Since G is connected, by the first part of Theorem 1 there exist some positive integers s and t_1, \dots, t_s so that $3 \leq s \leq 12$ and $t_1 + \dots + t_s = n$ and $G \cong G_s[K_{t_1}, \dots, K_{t_s}]$. Now we obtain all positive integers s and t_1, \dots, t_s where $3 \leq s \leq 12$ and $t_1 + \dots + t_s \leq 12$ such that

$$\lambda_1(G_s[K_{t_1}, \dots, K_{t_s}]) > 0, \quad \lambda_2(G_s[K_{t_1}, \dots, K_{t_s}]) > 0, \quad \text{and} \quad \lambda_3(G_s[K_{t_1}, \dots, K_{t_s}]) < 0.$$

We investigate the case $s = 5$, the other cases similarly is investigated. In other words assume that

$$\lambda_1(G_5[K_{t_1}, \dots, K_{t_5}]) > 0, \quad \lambda_2(G_5[K_{t_1}, \dots, K_{t_5}]) > 0, \quad \text{and} \quad \lambda_3(G_5[K_{t_1}, \dots, K_{t_5}]) < 0.$$

By the notation of Definition 3, since $B_5(t_1, t_2; t_3, t_4; t_5) \cong G_5[K_{t_1}, \dots, K_{t_5}]$, it suffices to obtain all values of t_1, \dots, t_5 such that

$$(2) \quad \lambda_1(B_5(t_1, t_2; t_3, t_4; t_5)) > 0, \quad \lambda_2(B_5(t_1, t_2; t_3, t_4; t_5)) > 0, \quad \text{and} \quad \lambda_3(B_5(t_1, t_2; t_3, t_4; t_5)) < 0.$$

By Theorem 2 we obtain that

$$(3) \quad P(B_5(t_1, t_2; t_3, t_4; t_5), \lambda) = (\lambda + 1)^{t_1 + \dots + t_5} \Phi(t_1, \dots, t_5, \lambda),$$

| The number of \dots graphs of order n | $n = 1$ | $n = 2$ | $n = 3$ | $n = 4$ | $n = 5$ | $n = 6$ |
|---|---------|---------|---------|---------|---------|---------|
| connected | 1 | 1 | 2 | 6 | 21 | 112 |
| connected and integral | 1 | 1 | 1 | 2 | 3 | 6 |
| connected with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 2 | 6 | 15 |
| connected integral with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $B_3(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 1 | 3 | 5 |
| $B_4(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 1 | 2 | 6 |
| $B_5(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 1 | 3 |
| $B_6(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 1 |
| $B_7(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $B_8(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $B_9(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $B_{10}(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $B_{11}(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 0 |
| $B_{12}(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE 1. The table of unlabeled connected graphs with some properties

where $\Phi(t_1, \dots, t_5, \lambda)$ is the characteristic polynomial of the matrix $M(t_1, \dots, t_5)$,

$$M(t_1, \dots, t_5) = \begin{pmatrix} t_1 - 1 & t_2 & 0 & 0 & t_5 \\ t_1 & t_2 - 1 & 0 & t_4 & t_5 \\ 0 & 0 & t_3 - 1 & t_4 & t_5 \\ 0 & t_2 & t_3 & t_4 - 1 & t_5 \\ t_1 & t_2 & t_3 & t_4 & t_5 - 1 \end{pmatrix}.$$

Using Equation (3) we conclude that the Equation (2) holds if and only if

$$(4) \quad \lambda_1(M(t_1, \dots, t_5)) > 0, \quad \lambda_2(M(t_1, \dots, t_5)) > 0, \quad \text{and} \quad \lambda_3(M(t_1, \dots, t_5)) < 0.$$

By Maple one can obtain all positive integers t_1, \dots, t_5 such that $t_1 + \dots + t_5 \leq 12$ and the Equation (4) holds. This completes the proof. \square

Remark 3.2. We note that among 1575 connected graphs of Theorem 3 just two of them are integral. These graphs are $B_3(2; 2; 3)$ and $B_3(3; 3; 2)$. In fact

$$\text{Spec}(B_3(2; 2; 3)) = \{5, 1, -1, -1, -1, -1, -2\}, \quad \text{and} \quad \text{Spec}(B_3(3; 3; 2)) = \{5, 2, -1, -1, -1, -1, -2\}.$$

We end the paper by comparing the number of connected graphs, the number of integral connected graphs and the number of connected graphs with positive second largest eigenvalue and negative third largest eigenvalue, see Tables 1 and 2. For every integer $n \geq 1$, let a_n be the number of connected

| The number of \dots graphs of order n | $n = 7$ | $n = 8$ | $n = 9$ | $n = 10$ | $n = 11$ | $n = 12$ |
|---|---------|---------|---------|----------|----------|-------------|
| connected | 853 | 11117 | 261080 | $> 10^7$ | $> 10^9$ | $> 10^{11}$ |
| connected and integral | 7 | 22 | 24 | 83 | 113 | ? |
| connected with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 31 | 66 | 129 | 255 | 444 | 627 |
| connected integral with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 1 | 1 | 0 | 0 | 0 | 0 |
| $B_3(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 8 | 11 | 15 | 19 | 24 | 29 |
| $B_4(.,.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 10 | 19 | 28 | 43 | 56 | 68 |
| $B_5(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 9 | 19 | 37 | 61 | 87 | 101 |
| $B_6(.,.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 3 | 12 | 28 | 64 | 109 | 142 |
| $B_7(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 1 | 4 | 16 | 42 | 87 | 119 |
| $B_8(.,.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 1 | 4 | 20 | 54 | 98 |
| $B_9(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 1 | 5 | 21 | 45 |
| $B_{10}(.,.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 1 | 5 | 20 |
| $B_{11}(.,.;.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 1 | 4 |
| $B_{12}(.,.)$ graphs with $\lambda_2 > 0$ and $\lambda_3 < 0$ | 0 | 0 | 0 | 0 | 0 | 1 |

TABLE 2. The table of unlabeled connected graphs with some properties

integral graphs of order n and b_n be the number of connected graphs of order n with $\lambda_2 > 0$ and $\lambda_3 < 0$. According to the third and the fourth row of the Tables 1 and 2 we conclude that for every $4 \leq n \leq 11$, $a_n \leq b_n$. Thus we pose the following problem:

Problem 1. Is it true that for every $n \geq 3$, $a_n \leq b_n$?

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REFERENCES

- [1] M.R. Oboudi, Bipartite graphs with at most six non-zero eigenvalues, *Ars Mathematica Contemporanea* **11** (2016) 315–325.
- [2] M.R. Oboudi, Characterization of graphs with exactly two non-negative eigenvalues, *Ars Mathematica Contemporanea* **12** (2017) 271–286.
- [3] M.R. Oboudi, On the third largest eigenvalue of graphs, *Linear Algebra and its Applications* **503** (2016) 164–179
- [4] M. Petrović, Graphs with a small number of nonnegative eigenvalues, *Graphs and Combinatorics* **15** (1999) 221–232.
- [5] J. H. Smith, Symmetry and multiple eigenvalues of graphs, *Glas. Mat., Ser. III* **12** (1977) No. 1, 3–8.

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