

№	Решение (дерево выигрышной стратегии)					Решение на Python	
1.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, v = 1, 2, 49 def F(k): return (k+p), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	13	Петя	Ваня	Петя	Ваня	
	20	12	26	52			
2.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, v = 1, 2, 58 def F(k): return (k+p), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	15	30	60			
	20	14	28	29	58		
3.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, v = 2, 3, 44 def F(k): return (k+p), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	5	15	45			
	20	11	13	15	45		
4.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, v = 2, 3, 53 def F(k): return (k+p), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	6	18	54			
	20	14	16	18	54		

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом

№	Решение (дерево выигрышной стратегии)					Решение на Python	
5.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, v = 1, 2, 102 def F(k): return (k+p), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	50	51	102			
	20	25	50	51	102		
6.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, v = 1, 2, 106 def F(k): return (k+p), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	52	53	106			
	20	26	52	53	106		
7.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, v = 1, 3, 39 def F(k): return (k+p), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	12	13	39			
	20	4	12	13	39		
8.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, v = 1, 3, 47 def F(k): return (k+p), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	15	16	48			
	20	5	15	16	48		

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом

№	Решение (дерево выигрышной стратегии)					Решение на Python	
9.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 3, 2, 32 def F(k): return (k+p1), (k+p2), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	8	Петя	Ваня	Петя	Ваня	
	20	12	15	16	32		
10.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 3, 2, 35 def F(k): return (k+p1), (k+p2), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	9	18	36			
	20	14	17	18	36		
11.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 3, 2, 39 def F(k): return (k+p1), (k+p2), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	10	20	40			
	20	16	19	20	40		
12.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 3, 2, 47 def F(k): return (k+p1), (k+p2), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	12	24	48			
	0	20	23	24	48		

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом

№	Решение (дерево выигрышной стратегии)					Решение на Python	
13.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 4, 2, 55 def F(k): return (k+p1), (k+p2), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	14	28	56			
	20	23	27	28	56		
14.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 4, 2, 60 def F(k): return (k+p1), (k+p2), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	15	30	60			
	20	25	29	30	60		
15.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 4, 2, 64 def F(k): return (k+p1), (k+p2), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	16	32	64			
	20	27	31	32	64		
16.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 5, 2, 72 def F(k): return (k+p1), (k+p2), (k*m) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	18	36	72			
	0	30	35	36	72		

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом

№	Решение (дерево выигрышной стратегии)					Решение на Python	
17.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 5, 3, 78 def F(k): return (k+p1), (k+p2), (k*m) z = range(1, v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	9	Петя	Ваня	Петя	Ваня	
	20	20	25	26	78		
18.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 6, 4, 88 def F(k): return (k+p1), (k+p2), (k*m) z = range(1, v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	6	24	96			
	20	15	21	22	88		
19.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 3, 2, 56 def F(k): return (k+p1), (k+p2), (k*m) z = range(1, v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	27	28	56			
	20	24	27	28	56		
20.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p1, p2, m, v = 1, 4, 5, 70 def F(k): return (k+p1), (k+p2), (k*m) z = range(1, v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	13	14	70			
	20	9	13	14	70		

*Примечание: Ходы выигрывающего игрока выделены *жирным курсивом*

№	Решение (дерево выигрышной стратегии)					Решение на Python	
21.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 27 def F(k): return (k+p), (k*m1), (k*m2) z = range(1, v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	9	3	9	27			
	20	4	8	9	27		
22.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 33 def F(k): return (k+p), (k*m1), (k*m2) z = range(1, v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	4	12	36			
	20	5	10	11	33		
23.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 43 def F(k): return (k+p), (k*m1), (k*m2) z = range(1, v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	5	15	45			
	20	7	14	15	45		
24.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 47 def F(k): return (k+p), (k*m1), (k*m2) z = range(1, v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>
	19	6	18	54			
	20	5	15	16	48		

*Примечание: Ходы выигрывающего игрока выделены *жирным курсивом*

№	Решение (дерево выигрышной стратегии)					Решение на Python				
25.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 63 def F(k): return (k+p), (k*m1), (k*m2) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>			
			19	7	21	63				
	20	10	20	21	63					
				40	120					
				60	180					
	21	18	19	21	63					
				40	120					
				60	180					
				36	108					
				54	162					
26.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 4, 58 def F(k): return (k+p), (k*m1), (k*m2) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if any(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>			
			19	4	16	64				
	20	7	14	15	60					
				28	112					
				56	224					
	21	12	13	15	60					
				28	112					
				56	224					
				24	96					
				48	192					
27.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 65 def F(k): return (k+p), (k*m1), (k*m2) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>			
			19	21	22	66				
	20	7	21	42	126					
				63	189					
				22	66					
	21	19	20	42	126					
				63	189					
				22	66					
				38	76					
				57	114					
28.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 69 def F(k): return (k+p), (k*m1), (k*m2) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>			
			19	22	23	69				
	20	11	22	44	132					
				66	198					
				23	69					
	21	20	21	44	132					
				66	198					
				23	69					
				40	120					
				60	180					

*Примечание: Ходы выигрывающего игрока выделены *жирным курсивом*

№	Решение (дерево выигрышной стратегии)					Решение на Python				
29.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 79 def F(k): return (k+p), (k*m1), (k*m2) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>			
			19	26	27	81				
	20	13	26	15	45					
				52	104					
				78	234					
	21	24	25	15	45					
				52	104					
				78	234					
				48	144					
				72	216					
30.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 3, 83 def F(k): return (k+p), (k*m1), (k*m2) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>			
			19	27	15	45				
	20	9	27	28	84					
				54	162					
				81	243					
	21	25	26	27	84					
				54	162					
				81	243					
				50	150					
				75	225					
31.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 2, 4, 44 def F(k): return (k+p), (k*m1), (k*m2) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>			
			19	10	11	44				
	20	5	10	20	80					
				40	160					
				11	44					
	21	8	9	20	80					
				40	160					
				11	44					
				16	64					
				32	128					
32.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m1, m2, v = 1, 3, 4, 35 def F(k): return (k+p), (k*m1), (k*m2) z = range(1,v) gp = {k for k in z if k<v} v1={x for x in gp if any(int(y)>=v for y in F(x))} n1={x for x in gp if all(y in v1 for y in F(x))} gp = gp - v1 - n1 v2={x for x in gp if any(y in n1 for y in F(x))} n2={x for x in gp if all(y in v2 or y in v1 for y in F(x))} a19=min(s for s in z if all(y in v1 for y in F(s))) print(a19) a20 = sorted(s for s in v2) print(*a20) a21 = min(s for s in n2) print(a21)</pre>			
			19	8	9	36				
	20	2	8	24	96					
				32	128					
				9	36					
	21	6	7	24	96					
				32	128					
				9	36					
				18	72					
				24	96					

*Примечание: Ходы выигрывающего игрока выделены *жирным курсивом*

№	Решение (дерево выигрышной стратегии)					Решение на Python	
33.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, s0, v = 1, 2, 5, 55 def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if any(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21)</pre>
	19	13, 5	Петя	Ваня	Петя	Ваня	
	20	22, 5	22, 10	23, 10	46, 10		
34.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, s0, v = 1, 2, 5, 63 def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if any(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21)</pre>
	19	15, 5	Петя	Ваня	Петя	Ваня	
	20	26, 5	26, 10	27, 10	54, 10		
35.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, s0, v = 1, 2, 7, 65 def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if any(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21)</pre>
	19	15, 7	Петя	Ваня	Петя	Ваня	
	20	25, 7	25, 14	26, 14	52, 14		

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом

№	Решение (дерево выигрышной стратегии)					Решение на Python	
36.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, s0, v = 1, 2, 7, 77 def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if any(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21)</pre>
	19	18, 7	Петя	Ваня	Петя	Ваня	
	20	31, 7	31, 14	32, 14	64, 14		
37.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, s0, v = 1, 3, 5, 61 def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if any(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21)</pre>
	19	7, 5	Петя	Ваня	Петя	Ваня	
	20	15, 5	15, 15	16, 15	48, 15		
38.	Задание	Ответ – нач.поз.	Делает ход*				<pre>p, m, s0, v = 1, 3, 7, 75 def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if any(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21)</pre>
	9	8, 7	Петя	Ваня	Петя	Ваня	
	20	11, 7	11, 21	12, 21	12, 63		

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом

№	Решение (дерево выигрышной стратегии)					Решение на Python	
39.	Задание 19	Ответ – нач.поз. 13, 4	Делает ход*				<p>p, m, s0, v = 1, 2, 4, 31</p> <pre>def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if all(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21)</pre>
			Петя	Ваня	Петя	Ваня	
			13, 5	26, 5			
			13, 8	26, 8			
	Задание 20	11, 4	11, 8	11, 9	22, 9		
				11, 16	11, 32		
				12, 8	24, 8		
				22, 8	44, 8		
		12, 4	13, 4	13, 5	26, 5		
				13, 8	26, 8		
				14, 4	28, 4		
				26, 4	52, 4		
Задание 21	10, 4	10, 10	10, 5	10, 10			
			20, 10	40, 10			
			10, 8				
			11, 9	22, 9			
	11, 4	11, 8	11, 16	11, 32			
			12, 8	24, 8			
			22, 8	44, 8			
			20, 4	40, 4			

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом

№	Решение (дерево выигрышной стратегии)					Решение на Python	
41.	Задание 19	Ответ – нач.поз. 21, 6	Делает ход*				<p>p, m, s0, v = 1, 2, 6, 49</p> <pre>def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if all(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21)</pre>
			Петя	Ваня	Петя	Ваня	
			21, 7	42, 7			
			21, 12	42, 12			
	Задание 20	18, 6	18, 12	22, 6	44, 6		
				42, 6	84, 6		
				18, 13	36, 13		
				18, 24	36, 24		
		20, 6	21, 6	19, 12	38, 12		
				36, 12	72, 12		
				21, 7	42, 7		
				21, 12	42, 12		
Задание 21	17, 6	17, 14	22, 6	44, 6			
			42, 6	84, 6			
			17, 15	34, 15			
			17, 28	17, 56			
	17, 12	18, 12	18, 14	36, 14			
			34, 14	68, 14			
			18, 13	36, 13			
			18, 24	36, 24			
18, 6	18, 12	19, 12	38, 12				
		36, 12	72, 12				
		34, 6	68, 6				

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом

№	Решение (дерево выигрышной стратегии)					Решение на Python	
43.	Задание 19	Ответ – нач.поз. 27, 8	Делает ход*				<pre> p, m, s0, v = 1, 2, 8, 63 def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if all(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21) </pre>
			Петя	Ваня	Петя	Ваня	
			27, 9	54, 9			
			27, 16	54, 16			
	Задание 20	23, 8	23, 16	28, 8	56, 8		
				54, 8	108, 8		
				23, 17	46, 17		
				23, 32	23, 64		
		26, 8	27, 8	24, 16	48, 16		
				46, 16	92, 16		
				27, 9	54, 9		
				27, 16	54, 16		
Задание 21	22, 8	22, 9	28, 8	56, 8			
			54, 8	108, 8			
			22, 19	44, 19			
			22, 36	22, 72			
	23, 8	23, 16	23, 18	46, 18			
			44, 18	88, 18			
			23, 17	46, 17			
			23, 32	23, 64			
44, 8	88, 8	24, 16	48, 16				
		46, 16	92, 16				
		23, 17	46, 17				
		23, 32	23, 64				
44.	Задание 19	Ответ – нач.поз. 33, 8	Делает ход*				<pre> p, m, s0, v = 1, 2, 8, 75 def F(k1, k2): return (k1+p, k2), (k1*m, k2), (k1, k2+p), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if all(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(*a20) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21) </pre>
			Петя	Ваня	Петя	Ваня	
			33, 9	66, 9			
			33, 16	66, 16			
	Задание 20	29, 8	29, 16	34, 8	68, 8		
				66, 8	132, 8		
				29, 17	58, 17		
				29, 32	29, 64		
		32, 8	33, 8	30, 16	60, 16		
				58, 16	116, 16		
				33, 9	66, 9		
				33, 16	66, 16		
Задание 21	28, 8	28, 9	34, 8	68, 8			
			66, 8	132, 8			
			28, 19	56, 19			
			28, 36	28, 72			
	28, 16	29, 16	29, 18	58, 18			
			56, 18	112, 18			
			29, 17	58, 17			
			29, 32	29, 64			
56, 8	112, 8	30, 16	60, 16				
		58, 16	116, 16				
		29, 17	58, 17				
		29, 32	29, 64				

*Примечание: Ходы выигрывающего игрока выделены *жирным курсивом*

№	Решение (дерево выигрышной стратегии)					Решение на Python	
45.	Задание 19	Ответ – нач.поз. 27, 8	Делает ход*				<pre> p, s0, v = 2, 8, 63 def F(k1, k2): return (k1+p, k2), (k1+k2, k2), (k1, k2+p), (k1, k2+k1) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if all(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(a20[0], a20[1]) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21) </pre>
			Петя	Ваня	Петя	Ваня	
			27, 10	27, 37			
			27, 35	27, 62			
	Задание 20	15, 8	15, 23	29, 8	29, 37		
				35, 8	35, 43		
				15, 25	40, 25		
				15, 38	53, 38		
		19, 8	27, 8	17, 23	40, 23		
				38, 23	38, 61		
				27, 10	27, 37		
				27, 35	27, 62		
Задание 21	24, 8	24, 10	29, 8	29, 37			
			35, 8	35, 43			
			26, 12	26, 38			
			26, 36	62, 36			
	26, 8	26, 10	28, 10	28, 38			
			36, 10	36, 46			
			24, 32	56, 32			
			32, 8	32, 40			
46.	Задание 19	Ответ – нач.поз. 43, 5	Делает ход*				<pre> m, s0, v = 2, 5, 95 def F(k1, k2): return (k1+k2, k2), (k1*m, k2), (k1, k2+k1), (k1, k2*m) z = range(1, v) gp = {(k1, k2) for k1 in z for k2 in z if k1+k2<v} v1 = {x for x in gp if any(sum(y)>=v for y in F(*x))} n1 = {x for x in gp if all(y in v1 for y in F(*x))} gp = gp - v1 - n1 v2 = {x for x in gp if any(y in n1 for y in F(*x))} n2 = {x for x in gp if all(y in v2 or y in v1 for y in F(*x))} Z = range(1, v-s0) a19 = min(s2 for s2 in Z if all(y in v1 for y in F(s0, s2))) print(a19) a20 = sorted(s2 for s1, s2 in v2 if s1==s0) print(min(a20), max(a20)) a21 = min(s2 for s1, s2 in n2 if s1==s0) print(a21) </pre>
			Петя	Ваня	Петя	Ваня	
			43, 48	43, 91			
			43, 10	86, 10			
	Задание 20	18, 5	18, 23	48, 5	48, 53		
				86, 5	172, 5		
				18, 41	18, 82		
				18, 46	18, 92		
		42, 5	42, 10	41, 23	82, 23		
				36, 23	72, 23		
				42, 52	42, 104		
				42, 20	84, 20		
Задание 21	33, 5	33, 10	52, 10	104, 10			
			84, 10	168, 10			
			33, 53	33, 106			
			33, 40	33, 80			
	38, 5	38, 10	53, 20	106, 20			
			66, 10	132, 10			
			38, 48	38, 96			
			38, 20	76, 20			
33, 38	33, 76	48, 10	96, 10				
		76, 10	152, 10				
		33, 38	33, 76				
		66, 5	132, 5				

*Примечание: Ходы выигрывающего игрока выделены *жирным курсивом*

№	Решение (дерево выигрышной стратегии)					№	Решение (дерево выигрышной стратегии)													
47.	Задание	Ответ – нач.поз.	Делает ход*				48.	Задание	Ответ – нач.поз.	Делает ход*										
			Петя	Ваня	Петя	Ваня				Петя	Ваня	Петя	Ваня							
	19	35	17	8				19	30	23	11									
	20	27	22	17	8						21	10								
		29		15	8						15	8								
	21	34	29	22	17	8		20	37	30	23	11								
					15	8							21	10						
			27	22	15	8				39	30	15	8							
			23		11	6		21	46			39	30	23	11					
	21	34	27	22	15	8						21		10						
11					6					15	8									

*Примечание: Ходы выигрывающего игрока выделены жирным курсивом