

Zonal Informatics Olympiad, 2022

Solutions

1. Minimum number of students that need to move

(a) $s = BBBBBGGGGG : 4$

(b) $s = GGGBBBBBBBG : 6$

(c) $s = BGGGBBBBBGGGBGGBGBGG : 6$

2. Number of valid partitions

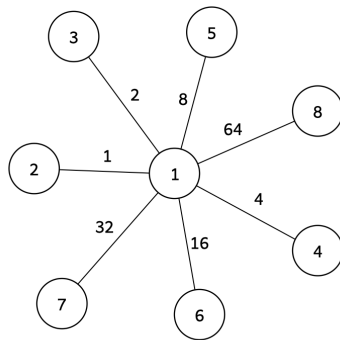
(a) $n = 10, k = 2 : 46$

(b) $n = 5, k = 5 : 42$

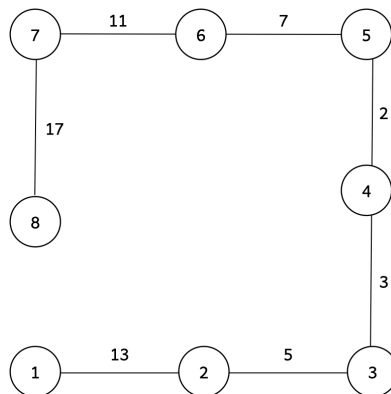
(c) $n = 10, k = 10 : 16796$

3. Sum of distances in an optimal pairing

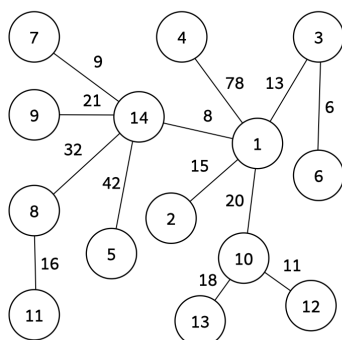
(a) 127



(b) 40



(c) 236



4. Compute the following quantities.

- (a) The product of the numbers in the list at position 20 in the sequence : 2
- (b) The sum of the numbers in the list at position 10^6 in the sequence : 20
- (c) The product of the numbers in the list at position 10^9 in the sequence : 864

Marking

The question paper carries 80 marks, broken up into four questions of 20 marks each. Each question has three parts. *If you solve all three parts correctly, you get 20 marks for that question.* Otherwise, you get 5 marks for each part that you solve correctly.

Qualifying cutoff

- Std 12: 50
- Std 11: 45
- Std 10: 40
- Std 9: 35
- Std 8 and below: 30

The cutoff score is relaxed by 5 marks for female students in each category.

Score distribution

Score	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5	0
Number at or below this score	0	0	2	5	16	34	66	103	150	207	255	288	324	350	372	396	402