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Individual Assignments #58

Assignment 5.2: 4, 6, 14, 30, 32

# Q4

1. ↾N/2↿ ≥3; N = 5
2. 13

# Q6

Bins = remainders = d

Objects = d+1

By pigeonhole principle at least one remainder must be hit twice for d+1 objects into d bins.

# Q14

1. N = object: integers, 7 possible  
   k = bins: sum to 11, 5 possible (1,10),(2,9),(3,8),(4,7),(5,6)  
   ↾7/5↿ = 2, proven by pigeonhole principle
2. Yes, ↾6/5↿ = 2, proven by pigeonhole principle

# Q30

N = 100,000,000 possible workers.

For k we have to assume the question meant something by the phrase “to the penny”, specifically the salaries ranged from $0.01 to 1,000,000.00 which are 99,999,999 possible salaries. Thus:

K = 99,999,999

↾100,000,000/99,999,999↿ = 2, proven by pigeonhole principle.

# Q32

Six computers attached to one of the other computers. There are 6 objects and 5 bins.

N = 6

K = 5

↾6/5↿ = 2, proven by pigeonhole principle.