Eric Rouse

Individual Assignments #58

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

Q4
   a) $\lceil N/2 \rceil \geq 3$; N = 5
   b) 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
   a) N = object: integers, 7 possible
       k = bins: sum to 11, 5 possible (1,10),(2,9),(3,8),(4,7),(5,6)
       $\lceil 7/5 \rceil$ = 2, proven by pigeonhole principle
   b) Yes, $\lceil 6/5 \rceil$ = 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

$\lceil 100,000,000/99,999,999 \rceil$ = 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

$\lceil 6/5 \rceil$ = 2, proven by pigeonhole principle.