

Instructions: For each of the weighted voting schemes below, calculate the Banzhaf power index for each. List all winning coalitions.

1. $[10; 7, 4, 3, 3, 1]$ $\{P_1, P_2, P_3, P_4, P_5\}$, $\{P_1, P_2, P_3, P_4\}$,
 $\{P_1, P_2, P_3, P_5\}$, $\{P_1, P_2, P_4, P_5\}$,
 $\{P_1, P_3, P_4, P_5\}$, $\{P_2, P_3, P_4, P_5\}$, $\{P_1, P_2, P_3\}$, $\{P_1, P_2, P_4\}$,
 $\{P_1, P_2, P_5\}$, $\{P_1, P_3, P_4\}$, $\{P_1, P_4, P_5\}$, $\{P_2, P_3, P_4\}$, $\{P_2, P_4\}$,
 $\{P_1, P_3\}$, $\{P_1, P_4\}$, $\{P_1, P_5\}$ 22

$$P_1 = \frac{12}{22} \quad P_2 = \frac{4}{22} \quad P_3 = \frac{3}{22} \quad P_4 = \frac{3}{22} \quad P_5 = \frac{0}{22}$$

55% 18% 14% 14% 0%

2. $[63; 30, 28, 22, 21, 2, 2]$ $\{P_1, P_2, P_3, P_4, P_5, P_6\}$, $\{P_1, P_2, P_3, P_4, P_5\}$,
 $\{P_1, P_2, P_3, P_4, P_6\}$, $\{P_1, P_2, P_3, P_5, P_6\}$, $\{P_1, P_2, P_4, P_5, P_6\}$, $\{P_1, P_3, P_4, P_5, P_6\}$,
 $\{P_2, P_3, P_4, P_5, P_6\}$, $\{P_1, P_2, P_3, P_4\}$, $\{P_1, P_2, P_4, P_5\}$, $\{P_1, P_2, P_3, P_6\}$, $\{P_1, P_3, P_4, P_5\}$,
 $\{P_1, P_3, P_4, P_6\}$, $\{P_1, P_2, P_4, P_5\}$, $\{P_1, P_2, P_4, P_6\}$, $\{P_2, P_3, P_4, P_5\}$, $\{P_1, P_3, P_4, P_6\}$,
 $\{P_1, P_2, P_3\}$, $\{P_1, P_2, P_4\}$, $\{P_1, P_3, P_4\}$, $\{P_2, P_3, P_4\}$ 36

$$P_1 = \frac{9}{36} \quad P_2 = \frac{9}{36} \quad P_3 = \frac{9}{36} \quad P_4 = \frac{9}{36} \quad P_5 = \frac{0}{36} \quad P_6 = \frac{0}{36}$$

25% 25% 25% 25% 0% 0%

3. $[1011; 278, 266, 188, 184, 94, 94]$ $\{P_1, P_2, P_3, P_4, P_5\}$

$$P_1 = \frac{1}{5} \quad P_2 = \frac{1}{5} \quad P_3 = \frac{1}{5} \quad P_4 = \frac{1}{5} \quad P_5 = \frac{1}{5}$$

20% 20% 20% 20% 20%

4. $[50; 17, 14, 12, 7, 6]$ $\{P_1, P_2, P_3, P_4, P_5\}$ $\{P_1, P_2, P_3, P_4\}$

$$P_1 = \frac{2}{8} \quad P_2 = \frac{2}{8} \quad P_3 = \frac{2}{8} \quad P_4 = \frac{2}{8} \quad P_5 = 0$$

25% 25% 25% 25% 0%