

5.5.1 Tournament selection with replacement

$$p < 1$$

Q:

	fitness
A	2
B	5
C	8
D	9
Sum	24

$$k = 2 \quad p = 0.8$$

tie-break : 2次抽到同一个体, 100% win

抽到2个不同个体, fitness同, 各50% win

Solution Q list all possible situations $4 \times 4 = 16$

list	win
A A	A
A B	B: 0.8 A: 0.2
A C	C ~ A ~
A D	D ~ A ~
B A	B A
B B	B

$$D > C > B > A$$

$$9 \quad 8 \quad 5 \quad 2$$

BC	C	B
BD	D	B
CA	C	A
CB	C	B
CC	C	
CD	D	C
DA	D	A
DB	D	B
DC	D	C
DD	D	

② count probability

$$P(A) = \frac{1}{16} + 6 \times \frac{1}{16} \times 0.2 = \frac{2.2}{16} = 0.1375$$

$$P(B) = \frac{1}{16} + 2 \times \frac{1}{16} \times 0.8 + 4 \times \frac{1}{16} \times 0.2 = \frac{3.4}{16} = 0.2125$$

$$P(C) = \frac{1}{16} + 4 \times \frac{1}{16} \times 0.8 + 2 \times \frac{1}{16} \times 0.2 = \frac{4.6}{16} = 0.2875$$

$$P(D) = \frac{1}{16} + 6 \times \frac{1}{16} \times 0.8 = \frac{5.8}{16} = 0.3625$$

$$0.1375 + 0.2125 + 0.2875 + 0.3625 = 1 \quad \text{No mistake.}$$