

# HW2

310554031 葉詠富

1.

p:admit princerton

s:admit stanford

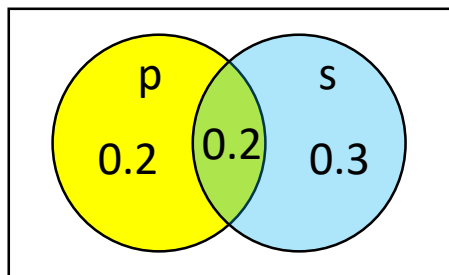
$$P(p) = 0.4$$

$$P(s) = 0.5$$

$$P(p \cap s) = 0.2$$

Ans:

(a)



(b)

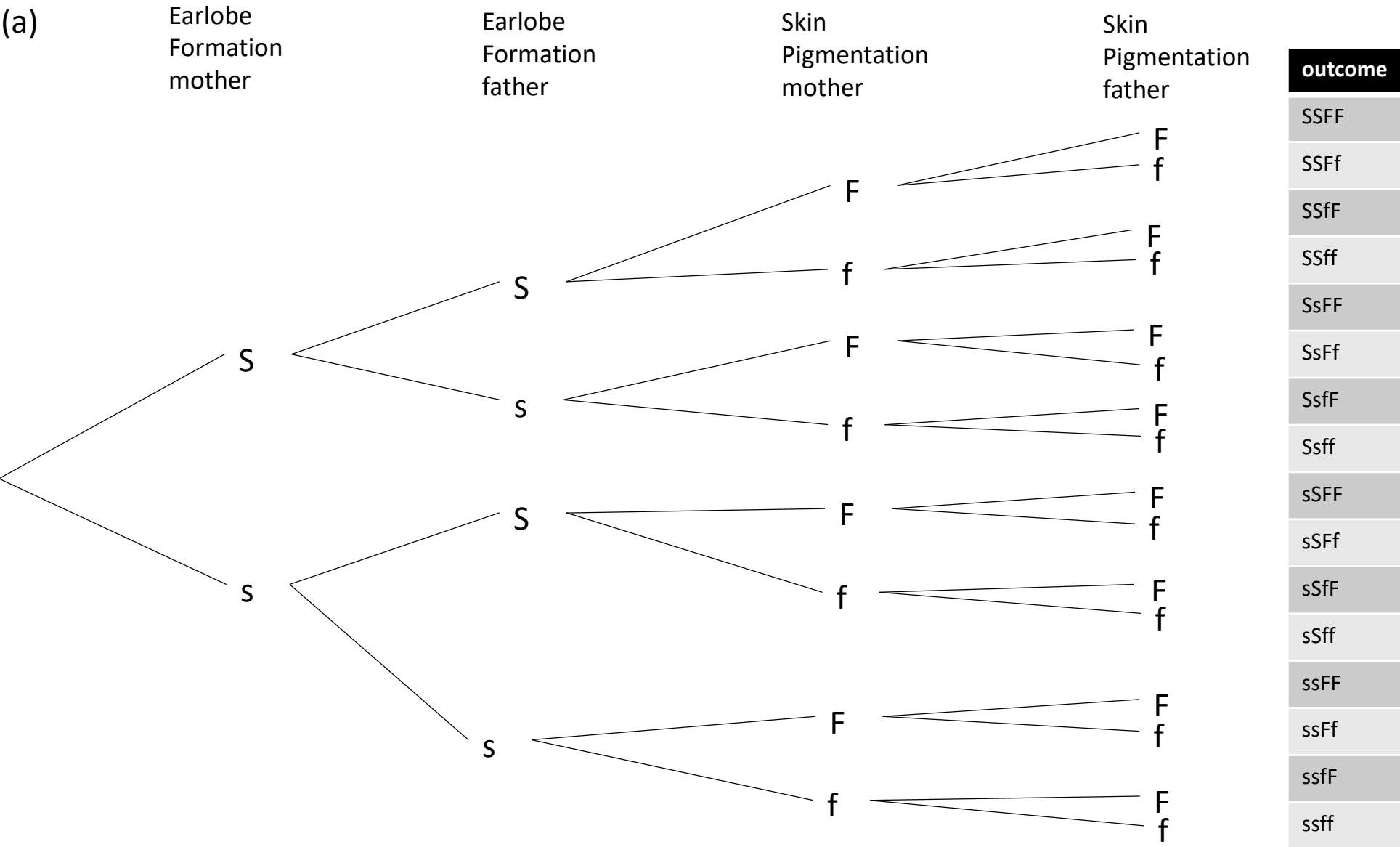
$$\begin{aligned} &1 - P(p \cup s) \\ &= 1 - (P(p) + P(s) - P(p \cap s)) \\ &= 1 - (0.4 + 0.5 - 0.2) \\ &= 0.3 \end{aligned}$$

(c)

$$P(s) - P(p \cap s) = 0.5 - 0.2 = 0.3$$

2. 父母皆是SsFf

Ans:



2.

Ans:

(b) (i) 有白化病 $\frac{1}{4}$ 、有耳垂 $\frac{1}{4}$ ， $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$

(ii) 無白化病 $\frac{3}{4}$ 、無耳垂 $\frac{3}{4}$ ， $\frac{3}{4} \times \frac{3}{4} = \frac{9}{16}$

(iii) 有白化病 =  $\frac{1}{4}$

(iv) 無耳垂 =  $\frac{3}{4}$

3.

Ans:

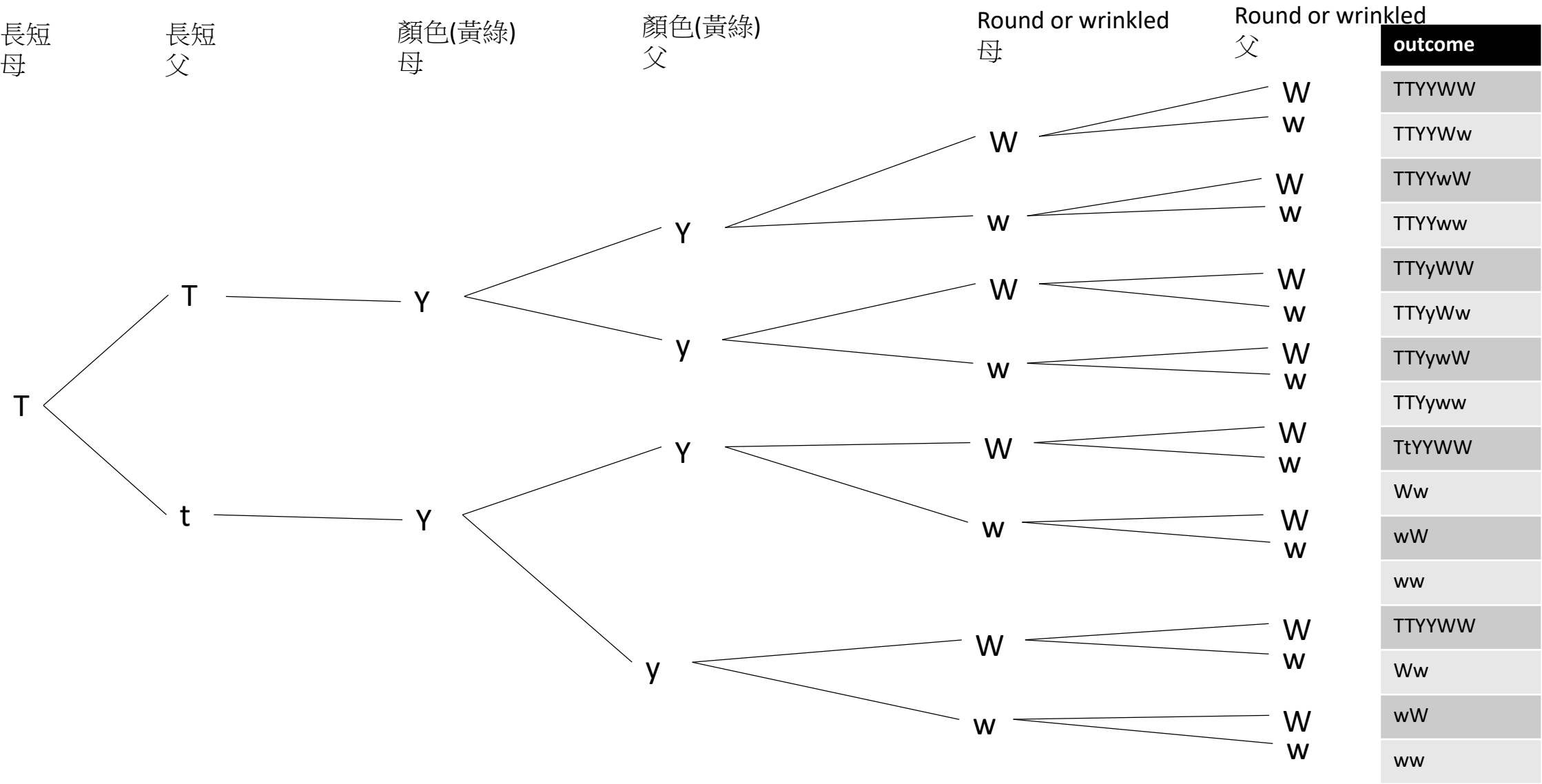
(a)

母:TTYWWw:tall、yellow、round

父:TtYyWw:tall、yellow、round

3.  
Ans:

(b)



3.

Ans:

(c)

生出的豌豆都是tall、yellow，唯一差別在shape round and wrinkled

(d)

tall的機率**100%**

(e)

tall、yellow不影響機率，只有shape round and wrinkled影響，根據下表可知wrinkle的機率為**1/4**

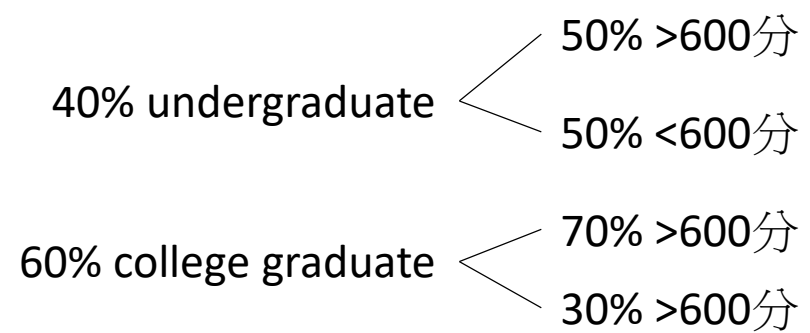
|   | W  | w  |
|---|----|----|
| W | WW | Ww |
| w | wW | ww |

(f)

生出的豌豆都是tall，所以short的機率**0%**

4.

Ans:

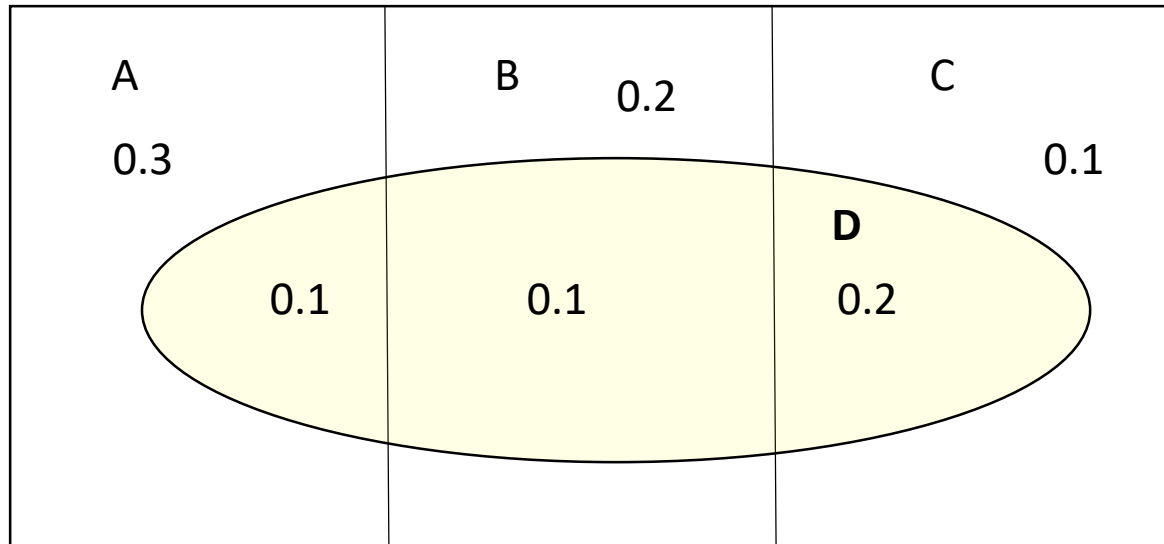


所以， $0.4 \times 0.5 + 0.6 \times 0.7 = 0.2 + 0.42 = \mathbf{0.62}$



5.

Ans:



因為A+B+C機率為1，所以依照題目畫出如上Venn diagram， $P(D)=0.1+0.1+0.2=0.4$

6.

Y:yes

A:security number end in odd digit

B:fraudulent insurance claim

Ans:

(a)

根據題目所敘述，回答Yes的機率  $P(Y) = P(Y \cap A) + P(Y \cap B)$

$$P(Y) = P(Y \cap A) + P(Y \cap B)$$

$$= P(Y|B)P(B) + P(Y|A)P(A)$$

$$\Rightarrow P(Y) - P(Y|A)P(A) = P(Y|B)P(B)$$

$$\Rightarrow \mathbf{P(Y|B)} = \frac{P(Y) - P(Y|A)P(A)}{p(B)}, \text{ 得證}$$

(b)

根據以上公式，和題目假設  $P(Y)=0.6$

$$P(Y|B) = \frac{0.6 - 0.5 * 0.5}{0.5} = \mathbf{0.7}$$