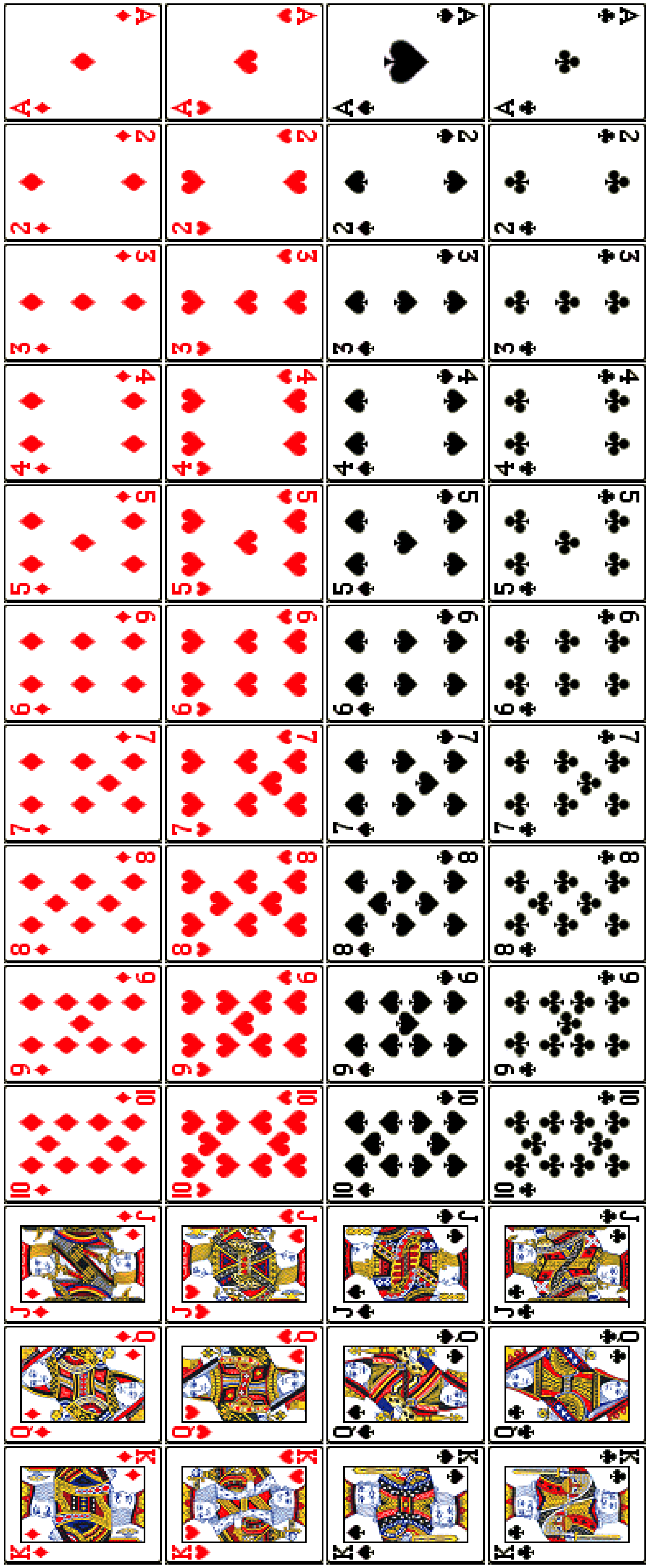
Red Red Black Black



Deal one card from a well-shuffled deck of playing cards.

Let R denote the event of getting a red card.	$P(R) = 26/52 = 1/2$
Let B denote the event of getting a black card.	$P(B) = 26/52 = 1/2$
Let A denote the event of getting an ace card.	$P(A) = 4/52 = 1/13$
Let J denote the event of getting a jack card.	$P(J) = 4/52 = 1/13$
Let Q denote the event of getting a queen card.	$P(Q) = 4/52 = 1/13$
Let K denote the event of getting a king card.	$P(K) = 4/52 = 1/13$
Let F denote the event of getting a face card.	$P(F) = 12/52 = 3/13$
Let H denote the event of getting a heart card.	$P(H) = 13/52 = 1/4$
Let D denote the event of getting a diamond card.	$P(D) = 13/52 = 1/4$
Let C denote the event of getting a club card.	$P(C) = 13/52 = 1/4$
Let S denote the event of getting a spade card.	$P(S) = 13/52 = 1/4$

Compound and Conditional Events

$P(R \text{ and } J) = P(R \cap J) = 2/52 = 1/26$
$P(R \text{ or } J) = P(R \cup J) = 28/52 = 7/13$
$P(J \text{ given } R) = P(J|\, R) = 2/26 = 1/13$
$P(R \text{ given } J) = P(R|\, J) = 2/4 = 1/2$

$P(J \text{ and } F) = P(J \cap F) = P(J) = 4/52 = 1/26$
$P(J \text{ or } F) = P(J \cup F) = P(F) = 12/52 = 3/13$
$P(J \text{ given } F) = P(J|\, F) = 4/12 = 1/3$
$P(F \text{ given } J) = P(F|J) = 4/4 = 1$

$P(H \text{ and } F) = P(H \cap F) = 3/52$
$P(H \text{ or } F) = P(H \cup F) = 22/52$
$P(H \text{ given } F) = P(H|\, F) = 3/12 = 1/4$
$P(F \text{ given } H) = P(F|\, H) = 3/13$

Complements

$$P(\text{not } H) = P(\overline{H}) = 39/52 = 3/4 = 1 - P(H)$$

$$P(\text{not } A) = P(\overline{A}) = 48/52 = 12/13 = 1 - P(A)$$

$$P(\text{not } F) = P(\overline{F}) = 40/52 = 10/13 = 1 - P(F)$$

Complements and Compound Events

$$P(\text{not } H \text{ and not } F) = P(\overline{H} \cap \overline{F}) = P(\overline{H \cup F}) = 1 - P(H \cup F) = 30/52$$

$$P(\text{not } H \text{ or not } F) = P(\overline{H} \cup \overline{F}) = P(\overline{H \cap F}) = 1 - P(H \cap F) = 49/52$$