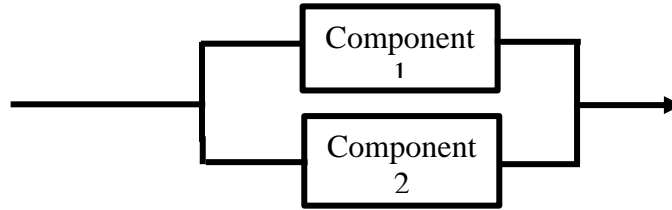5. Two components of a system are in parallel. The reliability of component 1 is $R_1 = 0.99$, and the reliability of component 2 is $R_2 = 0.98$. If the failures of the two components are independent, find the probability that the system works.

Solution
- Event A = component 1 works
- Event B = component 2 works

$R_1 = P(A) = 0.99$; $R_2 = P(B) = 0.98$; A and B are independent

Let C = success of the system
$$\overline{C} = \overline{A}\,\overline{B}$$
$$R_S = 1 - P(\overline{C}) = 1 - P(\overline{A}\,\overline{B})$$
$$= 1 - P(\overline{A})P(\overline{B}) = 1 - (1 - R_1)(1 - R_2)$$
$$= 1 - (1 - 0.99)(1 - 0.98) = 0.9998$$

Notice: $R_S \geq R_1$, $R_S \geq R_2$, $R_S \geq \max(R_1, R_2)$