

Esercizio Statistica: 06/03/2019

$$\Omega = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

$$A, B, C, D \in \mathcal{P}(\Omega)$$

$$A = \{4, 8\}$$

$$B = \{2, 3\}$$

$$C = \{8, 4, 9, 1, 6, 3\}$$

$$D = \{3, 6, 9, 8\}$$

1- $((A \cup B)^c \cap D^c) \cap C^c = \Omega^c$ FALSE

$$(A \cup B) = \{4, 8\} \cup \{2, 3\} = \{4, 8, 2, 3\}$$

$$(A \cup B)^c = \{4, 8, 2, 3\}^c = \{1, 5, 6, 7, 9, 10\}$$

$$((A \cup B)^c \cap D^c) = \{1, 5, 6, 7, 9, 10\} \cap \{3, 6, 9, 8\}^c$$

$$= \{1, 5, 6, 7, 9, 10\} \cap \{1, 2, 4, 5, 7, 10\} = \{1, 5, 7, 10\}$$

$$((A \cup B)^c \cap D^c) \cap C^c = \{1, 5, 7, 10\} \cap \{8, 4, 9, 1, 6, 3\}^c$$

$$= \{1, 5, 7, 10\} \cap \{2, 5, 7, 10\} = \{5, 7, 10\}$$

$$((A \cup B)^c \cap D^c) \cap C^c = \Omega^c$$

$$\{5, 7, 10\} = \emptyset \text{ FALSE}$$

2- $((A \cap B)^c \cup D^c) \cup C^c = \Omega$ TRUE

$$(A \cap B) = \{4, 8\} \cap \{2, 3\} = \emptyset$$

$$(A \cap B)^c = \emptyset^c = \Omega$$

$$(A \cap B)^c \cup D^c = \Omega \cup D^c = \Omega$$

$$((A \cap B)^c \cup D^c) \cup C^c = \Omega \cup C^c = \Omega$$

$$((A \cap B)^c \cup D^c) \cup C^c = \Omega$$

$$\Omega = \Omega \text{ TRUE}$$

$$(B \cap C)^c \cup A^c = (A \cap B)^c \cup C^c \quad \text{TRUE}$$

$$(B \cap C) = \{2, 3\} \cap \{8, 4, 9, 1, 6, 3\} = \{3\}$$

$$(B \cap C)^c = \{3\}^c = \{1, 2, 4, 5, 6, 7, 8, 9, 10\}$$

$$(B \cap C)^c \cup A^c = \{1, 2, 4, 5, 6, 7, 8, 9, 10\} \cup \{4, 8\}^c$$

$$= \{1, 2, 4, 5, 6, 7, 8, 9, 10\} \cup \{1, 2, 3, 5, 6, 7, 9, 10\}$$

$$= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} = \Omega$$

$$(A \cap B) = \{4, 8\} \cap \{2, 3\} = \emptyset$$

$$(A \cap B)^c = \Omega$$

$$(A \cap B)^c \cup C^c = \Omega \cup C^c = \Omega$$

$$(B \cap C)^c \cup A^c = (A \cap B)^c \cup C^c$$

$$\Omega = \Omega \quad \text{TRUE}$$

$$4 - ((C^c \Delta D^c) \cap B)^c = \emptyset \quad \text{FALSE}$$

$$(C^c \Delta D^c) = \{8, 4, 9, 1, 6, 3\}^c \Delta \{3, 6, 9, 8\}^c$$

$$= \{2, 5, 7, 10\} \Delta \{1, 2, 4, 5, 7, 10\}$$

$$= \{2, 5, 7, 10\} \setminus \{1, 2, 4, 5, 7, 10\} \cup \{1, 2, 4, 5, 7, 10\} \setminus \{2, 5, 7, 10\}$$

$$= \{\emptyset\} \cup \{1, 4\} = \{1, 4\}$$

$$(C^c \Delta D^c) \cap B = \{1, 4\} \cap \{2, 3\} = \emptyset$$

$$((C^c \Delta D^c) \cap B)^c = \{\emptyset\}^c = \Omega$$

$$((C^c \Delta D^c) \cap B)^c = \emptyset$$

$$\Omega = \emptyset \quad \text{FALSE}$$

$$5 - (A \Delta C \Delta D) \cap B = \emptyset \quad \text{TRUE}$$

$$(A \Delta C) \Delta D = (\{4, 8\} \Delta \{8, 4, 9, 1, 6, 3\}) \Delta \{3, 6, 9, 8\}$$

$$= (\{\emptyset\} \cup \{9, 1, 6, 3\}) \Delta \{3, 6, 9, 8\}$$

$$= \{9, 1, 6, 3\} \Delta \{3, 6, 9, 8\}$$

$$= \{1\} \cup \{8\} = \{1, 8\}$$

$$(A \Delta C \Delta D) \cap B = \{1, 8\} \cap \{2, 3\} = \emptyset$$

$$(A \Delta C \Delta D) \cap B = \emptyset$$

$$\emptyset = \emptyset \quad \text{TRUE}$$