SRP KEY TERMS

Set Theory

Cartesian Product: $A \times B = \{(x, y) \mid x \in A \wedge y \in B\}$

Complement: $A - B = \{x \mid x \in A \wedge \neg x \in B\}$

Empty set: $\varnothing = \{\ \}$

Extensionality: $\forall x \forall y\ ((Sx \wedge Sy) \rightarrow (x = y \leftrightarrow \forall z\ (z \in x \leftrightarrow z \in y)))$

Intersection: $A \cap B = \{x \mid x \in A \wedge x \in B\}$

Ordered pair: $(x, y) = \{\{x\}, \{x, y\}\}$

Power Set: $\wp(A) = \{x \mid x \subseteq A\}$

Proper subset: $A \subset B$ iff $\forall x\ (x \in A \rightarrow x \in B) \wedge \exists x\ (x \in B \wedge \neg x \in A)$

Subset: $A \subseteq B$ iff $\forall x\ (x \in A \rightarrow x \in B)$

Union: $A \cup B = \{x \mid x \in A \vee x \in B\}$

Relations

Reflexivity: $\forall x\ Rxx$

Symmetry: $\forall x\ \forall y\ (Rxy \rightarrow Ryx)$

Transitivity: $\forall x\ \forall y\ \forall z\ ((Rxy \wedge Ryz) \rightarrow Rxz)$

Converse: If R is a relation then the converse R' of R satisfies:
$\forall x\ \forall y\ (R'xy \leftrightarrow Ryx)$

Ancestral: If R is a relation then the ancestral R* of R satisfies:
$\forall x \forall y\ (R^*xy \leftrightarrow (Rxy \vee \exists z_1 \ldots z_n\ (Rxz_1 \wedge Rz_1z_2 \ldots \wedge Rz_ny))$

Equivalence rel.: R is reflexive, symmetric and transitive

Equivalence class: C is an equivalence class for R iff R is an equivalence relation and $C = \{x \mid \forall y\ (Rxy \leftrightarrow y \in C)\}$

Probability

Sample Space / Reference set: V = set of outcomes of interest

Field: $F = \wp(V)$

Axiom1: $Pr\ (V) = 1$

Axiom 2: $Pr\ (X) \geq 0$

Axiom 3: If $A \cap B = \varnothing$ then $Pr\ (A) + Pr\ (B) = Pr\ (A \cup B)$

Complement: $A^* = V - A = \neg A$

Conditional Prob: $Pr\ (A \mid B) = Pr\ (A \cap B)\ /\ Pr\ (B)$

Bayes's Theorem 1: $Pr\ (A \mid B)\ Pr\ (B) = Pr\ (B \mid A)\ Pr\ (A)$

Bayes's Theorem 2:

$$Pr\ (A \mid B) = \frac{Pr\ (B \mid A)\ Pr\ (A)}{Pr\ (B \mid A)\ Pr\ (A) + Pr\ (B \mid \neg A)\ Pr\ (\neg A)}$$