Next-Next-Gen Notes
Object-Oriented Maths

JP Guzman

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Format: $characteristic((subjects),(dependencies)) \iff (conditions(dependencies)) \wedge (conditions(subjects))$
Note: All weaker objects automatically induces notions inherited from stronger objects.
TODO assign free variables as parameters
TODO define || abs cross-product and other missing refs
TODO distinguish new condition vs implied proposition - separate propositions into new line thms
TODO silent link expressions! - e.g. $backslashsilentPLPL_X$

1 Logic and Set Theory

1.1 Logic SHENANNIGANS

$$truth[t][] := t = \begin{cases} TRUE \\ FALSE \end{cases} \tag{1}$$

$$statement[s][] := correctSyntaxSemantics[s][] \tag{2}$$

$$proposition[s,t][] := (statement[s][]),(truth[t][]) \tag{3}$$

$$operatorNOT[\neg][x] := (truth[x][]),(\neg x = \begin{cases} TRUE & x = FALSE \\ FALSE & x = TRUE \end{cases}) \tag{4}$$

$$operatorAND[\wedge][x,y] := (truth[x][]),(truth[y][]),(x \wedge y = \begin{cases} FALSE & x = FALSE, y = FALSE \\ FALSE & x = FALSE, y = TRUE \\ FALSE & x = TRUE, y = FALSE \\ TRUE & x = TRUE, y = TRUE \end{cases}) \tag{5}$$

$$operatorOR[\vee][x,y] := (truth[x][]),(truth[y][]),(x \vee y = \begin{cases} FALSE & x = FALSE, y = FALSE \\ TRUE & x = FALSE, y = TRUE \\ TRUE & x = TRUE, y = FALSE \\ TRUE & x = TRUE, y = TRUE \end{cases}) \tag{6}$$

$$operatorXOR[\veebar][x,y] := (truth[x][]),(truth[y][]),(x \veebar y = \begin{cases} FALSE & x = FALSE, y = FALSE \\ TRUE & x = FALSE, y = TRUE \\ TRUE & x = TRUE, y = FALSE \\ FALSE & x = TRUE, y = TRUE \end{cases}) \tag{7}$$

$$start linking, dont bother with the line length \tag{8}$$

$$^{THM-BD9H}(x = \neg\neg x) \tag{9}$$

$$THM\text{-}5GKR(x \wedge \neg x = FALSE) \tag{10}$$

$$THM\text{-}6QAF(x \vee \neg x = TRUE) \tag{11}$$

$$THM\text{-}4I4D(x \wedge TRUE = x) \tag{12}$$

$$THM\text{-}VSO2(x \vee FALSE = x) \tag{13}$$

$$THM\text{-}OQJZ(x \wedge FALSE = FALSE) \tag{14}$$

$$THM\text{-}Z361(x \vee TRUE = TRUE) \tag{15}$$

$$THM\text{-}I2RC(x \wedge x = x) \tag{16}$$

$$THM\text{-}XJO3(x \vee x = x) \tag{17}$$

$$THM\text{-}I2RC(x \wedge y = y \wedge x) \tag{18}$$

$$THM\text{-}XJO3(x \vee y = y \vee x) \tag{19}$$

$$operatorIF[\implies][x,y] := (truth[x][]), (truth[y][]), (x \implies y = \begin{cases} TRUE & x = FALSE, y = FALSE \\ TRUE & x = FALSE, y = TRUE \\ FALSE & x = TRUE, y = FALSE \\ TRUE & x = TRUE, y = TRUE \end{cases}) \tag{20}$$

$$operatorOIF[\impliedby][x,y] := (truth[x][]), (truth[y][]), (x \impliedby y = \begin{cases} TRUE & x = FALSE, y = FALSE \\ FALSE & x = FALSE, y = TRUE \\ TRUE & x = TRUE, y = FALSE \\ TRUE & x = TRUE, y = TRUE \end{cases}) \tag{21}$$

$$operatorIIF[\iff][x,y] := (truth[x][]), (truth[y][]), (x \iff y = \begin{cases} TRUE & x = FALSE, y = FALSE \\ FALSE & x = FALSE, y = TRUE \\ FALSE & x = TRUE, y = FALSE \\ TRUE & x = TRUE, y = TRUE \end{cases}) \tag{22}$$

1.2 Predicate shennanigans

$$0 \tag{23}$$

$$0 \tag{24}$$

2 Glossary