

# BFO 2020 History Axioms

(1) History of is functional on second argument

$$\forall p,q,r (\text{historyOf}(p,q) \wedge \text{historyOf}(p,r) \rightarrow q=r)$$

(2) History of is functional on first argument

$$\forall p,q,r (\text{historyOf}(p,q) \wedge \text{historyOf}(r,q) \rightarrow p=r)$$

(3) Every material entity has a history

$$\forall m (\exists t \text{instanceOf}(m, \text{materialEntity}, t) \rightarrow \exists h \text{historyOf}(h, m))$$

(4) Every history is of a material entity

$$\forall h (\exists t \text{instanceOf}(h, \text{history}, t) \rightarrow \exists m \text{historyOf}(h, m))$$

(5) History of and has history are inverse relations

$$\forall a,b (\text{historyOf}(a,b) \leftrightarrow \text{hasHistory}(b,a))$$

(6) History of has domain history and range material entity

$$\forall a,b (\text{historyOf}(a,b) \rightarrow \exists t \text{instanceOf}(a, \text{history}, t) \wedge \exists t \text{instanceOf}(b, \text{materialEntity}, t))$$

(7) Material entity and its history exist at exactly the same times

$$\forall m,h (\text{historyOf}(h,m) \rightarrow \forall t (\text{instanceOf}(m, \text{materialEntity}, t) \leftrightarrow \text{instanceOf}(h, \text{history}, t)))$$

(8) A material entity participates in its history

$$\forall h,m (\text{historyOf}(h,m) \rightarrow \forall t (\text{existsAt}(m,t) \rightarrow \text{participatesIn}(m,h,t)))$$