$[STUDENT, MODULE, TIMESLOT, ROOM]$

$[X, Y, Z]$

$$allPairs : (X \pfun (Y \rel Z)) \fun (Y \rel Z)$$

$$\forall f : (X \pfun (Y \rel Z)) \bullet$$
$$allPairs\, f =$$
$$\bigcup \{x : X \mid x \in \dom f \bullet f x\}$$

$Timetable$

$$studentTT : STUDENT \pfun (TIMESLOT \pfun ROOM)$$
$$moduleTT : MODULE \pfun (TIMESLOT \rel ROOM)$$

$$\forall r, s : \ran moduleTT \bullet$$
$$\mathsf{disjoint}\ \langle r, s \rangle$$

$$allPairs\, studentTT \subseteq allPairs\, moduleTT$$

$$\forall s : \dom studentTT;\ m : \dom moduleTT$$
$$\bullet\ (studentTT\, s \cap moduleTT\, m) \neq \emptyset \Rightarrow$$
$$\dom(studentTT\, s \cap moduleTT\, m) = \dom(moduleTT\, m)$$

$InitTimetable$

$$Timetable'$$

$$studentTT' = \{\}$$
$$moduleTT' = \{\}$$

$AddStudent$

$$\Delta Timetable$$
$$s? : STUDENT$$

$$s? \notin \dom studentTT$$
$$studentTT' = studentTT \cup \{s? \mapsto \emptyset\}$$
$$moduleTT' = moduleTT$$

$ScheduleModule$

$$\Delta Timetable$$
$$m? : MODULE$$

$$m? \in \dom moduleTT$$
$$moduleTT\, m? = \emptyset$$
$$\exists schedule : TIMESLOT \rel ROOM \bullet$$
$$(allPairs\, moduleTT \cap schedule = \emptyset$$
$$\land\ moduleTT' = moduleTT \oplus \{m? \mapsto schedule\})$$
$$studentTT' = studentTT$$

DescheduleModule

$\Delta Timetable$
$m? : MODULE$

$m? \in \operatorname{dom} moduleTT$
$moduleTT\ m? \neq \emptyset$
$moduleTT' = moduleTT \oplus \{m? \mapsto \emptyset\}$
$studentTT' =$
$\bigcup \{s : \operatorname{dom} studentTT \bullet$
$\{s \mapsto (studentTT\ s \setminus moduleTT\ m?)\}\}$

RegForModule

$\Delta Timetable$
$s? : STUDENT$
$m? : MODULE$

$s? \in \operatorname{dom} studentTT$
$m? \in \operatorname{dom} moduleTT$
$moduleTT\ m? \neq \emptyset$
$\operatorname{dom}(studentTT\ s?) \cap \operatorname{dom}(moduleTT\ m?) \neq \emptyset$

$\exists\, newPairs : TIMESLOT \nrightarrow ROOM$
$\bullet$
$((\operatorname{dom} newPairs = \operatorname{dom} moduleTT\ m?)$
$\land\ (newPairs \subseteq moduleTT\ m?)$
$\land\ (studentTT' =$
$studentTT \oplus \{s? \mapsto studentTT\ s? \cup newPairs\}))$

$moduleTT' = moduleTT$