MACHINE
Employee
SEES
String
USES
Company
SETS
$EMPLOYEE$; $STUDIES = \{elementary, secondary, higher\}$
CONSTANTS
max_salary
PROPERTIES
$max\_salary \in STUDIES \to \mathbb{N} \land$
$max\_salary = \{(elementary \mapsto 10), (secondary \mapsto 20), (higher \mapsto 50)\}$
VARIABLES
$employee$, $identifier$, $employee\_name$, $employer$, $studies$, $salary$
INVARIANT
$employee \subseteq EMPLOYEE \land$
$identifier \in employee \rightarrowtail \mathbb{N}_1 \land$
$employee\_name \in employee \to STR \land$
$studies \in employee \to STUDIES \land$
$salary \in employee \to \mathbb{N} \land$
$employer \in employee \to company \land$
$\forall\ emp\ .\ (emp \in employee \Rightarrow salary(emp) \leq max\_salary(studies(emp)))$

INITIALISATION
$employee := \emptyset \parallel identifier := \emptyset \parallel employee\_name := \emptyset \parallel$
$employer := \emptyset \parallel studies := \emptyset \parallel salary := \emptyset$
OPERATIONS

$employee\_value \leftarrow$ **create_employee**$(id\_value, name\_value, company\_value, studies\_value, salary\_value) \mathrel{\widehat{=}}$
PRE
$name\_value \in STR \land$
$id\_value \in \mathbb{N}_1 \land$
$id\_value \notin$ **ran**$(identifier) \land$
$company\_value \in company \land$
$studies\_value \in STUDIES \land$
$salary\_value \in \mathbb{N} \land$
$salary\_value \leq max\_salary(studies\_value)$
THEN
ANY emp
WHERE $emp \in EMPLOYEE$ - $employee$
THEN
$employee := employee \cup \{emp\} \parallel$
employee_name$(emp) := name\_value \parallel$
identifier$(emp) := id\_value \parallel$
employer$(emp) := company\_value \parallel$

$\mathbf{studies}(emp) := studies\_value \;||$
$\mathbf{salary}(emp) := salary\_value \;||$
$employee\_value := emp$
END
END;

$id\_value \leftarrow \mathbf{get\_employee\_id}(employee\_value) \mathrel{\widehat{=}}$
PRE
$employee\_value \in employee$
THEN
$id\_value := identifier(employee\_value)$
END;

$name\_value \leftarrow \mathbf{get\_employee\_name}(employee\_value) \mathrel{\widehat{=}}$
PRE
$employee\_value \in employee$
THEN
$name\_value := employee\_name(employee\_value)$
END;

$company\_value \leftarrow \mathbf{get\_employee\_employer}(employee\_value) \mathrel{\widehat{=}}$
PRE
$employee\_value \in employee$
THEN
$company\_value := employer(employee\_value)$
END;

$studies\_value \leftarrow \mathbf{get\_employee\_studies}(employee\_value) \mathrel{\widehat{=}}$
PRE
$employee\_value \in employee$
THEN
$studies\_value := studies(employee\_value)$
END;

$salary\_value \leftarrow \mathbf{get\_employee\_salary}(employee\_value) \mathrel{\widehat{=}}$
PRE
$employee\_value \in employee$
THEN
$salary\_value := salary(employee\_value)$
END;

$\mathbf{set\_employee\_id}(employee\_value,\ id\_value) \mathrel{\widehat{=}}$
PRE
$employee\_value \in employee \wedge$
$id\_value \in \mathbb{N}_1 \wedge$
$id\_value \notin \mathbf{ran}(identifier)$
THEN
$\mathbf{identifier}(employee\_value) := id\_value$
END;

$\mathbf{set\_employee\_name}(employee\_value,\ name\_value) \mathrel{\widehat{=}}$
PRE
$employee\_value \in employee \wedge$

$name\_value \in STR$
THEN
employee_name($employee\_value$) := $name\_value$
END;

set_employee_employer($employee\_value$, $company\_value$) $\widehat{=}$
PRE
$employee\_value \in employee \wedge$
$company\_value \in company$
THEN
employer($employee\_value$) := $company\_value$
END;

set_employee_studies($employee\_value$, $studies\_value$) $\widehat{=}$
PRE
$employee\_value \in employee \wedge$
$studies\_value \in STUDIES \wedge$
$salary(employee\_value) \leq max\_salary(studies\_value)$
THEN
studies($employee\_value$) := $studies\_value$
END;

set_employee_salary($employee\_value$, $salary\_value$) $\widehat{=}$
PRE
$employee\_value \in employee \wedge$
$salary\_value \in \mathbb{N} \wedge$
$salary\_value \leq max\_salary(studies(employee\_value))$
THEN
salary($employee\_value$) := $salary\_value$
END;

destroy_employee($employee\_value$) $\widehat{=}$
PRE
$employee\_value \in employee$
THEN
$employee := employee - \{employee\_value\} \;||$
$identifier := \{employee\_value\} \lhd identifier \;||$
$employee\_name := \{employee\_value\} \lhd employee\_name \;||$
$employer := \{employee\_value\} \lhd employer \;||$
$studies := \{employee\_value\} \lhd studies \;||$
$salary := \{employee\_value\} \lhd salary$
END;

delete_all_employees_from_company($company\_value$) $\widehat{=}$
PRE
$company\_value \in company$
THEN
$employee := employee - employer^{-1}[\{company\_value\}] \;||$
$identifier := employer^{-1}[\{company\_value\}] \lhd identifier \;||$
$employee\_name := employer^{-1}[\{company\_value\}] \lhd employee\_name \;||$
$studies := employer^{-1}[\{company\_value\}] \lhd studies \;||$
$salary := employer^{-1}[\{company\_value\}] \lhd salary \;||$
$employer := employer \rhd \{company\_value\}$

END

END