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SER 315 Assignment 5 - Operational Pattern

Operation = book_appointment_by_time_subject

Description = A student can book an appointment by subject and time. Precondition for

this operation is that both the student with the email and the subject exist in the system. The student must have enough credit or the system will return an error message. If the student does have enough credits then the system checks to see if the student has an appointment at this time. If the student does have an appointment the system will return an error message. If not the system checks if there is an open appointment at this time with the appropriate subject. If there is not an appointment available then the system will return an error message. If the appointment is available the student will be linked to this appointment and the student's credits are reduced by one and the tutor is informed.

Input = subj: String, t: String, email String

Reads = ms: ManagementSystem, ma: ManageAppointments with (ms, ma) \in

communicates_1, bc: Book /CancelAppointment with (bc, ma) \in
communicates_2 \wedge (bc, s) \in Manages, t: TutorData, sub: Subject with (t, ms) \in
manages_2 \wedge (sub, t) \in signs_up_for \wedge subj = sub.name, a: Appointment with
(a, t) \in oversees, communicates_1, communicates_2, Manages, manages_2,
signs_up_for

Changes = Books, s: StudentData with s.email = email \wedge (s,a) \in Books

Sends = Student: {appointment_booked, no_tutor available,

already_an_appointment_booked, not_enough_credit}

Tutor: {appointment_scheduled}

Pre = Implicit

Post = Let

Enough_credit == s.numCredits >= 1

Not_already_an_appt == (s, a) \notin Books \vee (s, a) \in Books \wedge a.time \neq t

tutor_with_subject/time_available == (t,a) \in oversees \wedge a.time = t \wedge
(\forall s:Students • (s,a) \notin Books) \wedge (t, sub) \in signs_up_for \wedge subj = sub.name

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[(Enough_credit \Rightarrow

[(Not_already_an_appt \Rightarrow

(tutor_with_subject/time_available \Rightarrow

s.numCredits' == s.numCredits - 1 \wedge

Is_sent{appointment_booked} \wedge

Is_sent[Tutor]{appointment_scheduled} \wedge

Books' = Books \cup {(s,a)} \wedge

no_effect) \wedge

(\neg tutor_with_subject/time_available \Rightarrow

Is_sent{no_tutor_available} \wedge

no_effect)] \wedge

(\neg Not_already_an_appt \Rightarrow

Is_sent{already_an_appointment_booked} \wedge

no_effect)] \wedge

(\neg Enough_credit \Rightarrow

Is_sent{not_enough_credit} \wedge

no_effect)

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