4a-b formal specification exercises

2.1

P: System Software is in debug mode

Q: Users have database access.

R: Users can save new records.

1.1) $P \longrightarrow \sim Q \iff \sim P \vee \sim Q$
1.2) $Q \longrightarrow R \iff \sim Q \vee R$
1.3) $\sim R \longrightarrow \sim P \iff R \vee \sim P$

2.2) Consistency :-

P	Q	R	$\sim P \vee \sim Q$	$\sim Q \vee R$	$R \vee \sim P$
T	T	T	F	T	T
T	T	F	T	F	F
T	F	T	T	T	T
T	F	F	T	T	F
F	T	T	T	T	T
F	T	F	T	F	T
F	F	T	T	T	T
F	F	F	T	T	T

$\therefore \quad (F_1 \wedge F_2 \wedge F_3) \longrightarrow G \longrightarrow$ Tautology

∴ all the requirements are consistent.

3)

3.1 1) <u>Add Meeting</u>

Δ MeetingPlanner
name? : NAME
dateTime? DATETIME
meeting Id? : MEETING ID.

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meetingId? ∉ scheduled
when' = when ∪ {meetingId? ↦ dateTime?}

participant' = participant ∪ {name? ↦ meetingId?}

2) <u>FindMeeting</u>

Ξ MeetingPlanner
meetingId? : MEETINGID
datetime? : DATETIME
name! : ~~PNAME~~ PNAME

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meetingid? : Ξ scheduled
datetime?: when (meetingid?)
name! = {x : participant | participant (n) = meetingid?}

3.2

1) RAddMeeting = (AddMeeting ∧ Success) ∨ AlreadyKnown

2)

AddMeeting ∧ Success
┌─────────────────────────────────────
│ Δ MeetingPlanner
│ name? : NAME
│ meetingid? : MEETINGID
│ datetime? : DATE TIME
│ result! : REPORT
├─────────────────────────────────────
│
│ meetingid? ∉ scheduled
│ participant' = participant ∪ {name? ↦ meetingid?}
│ when' = when ∪ {meetingid? ↦ datetime?}
│ result! : ok
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