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Project 2 Design

Semaphores

Patient_enters: keeps tracks of patients that enter the clinic. Initial value is zero.

Receptionist_ready: keeps track of available receptionists. Initialized at zero until receptionist (one) is created.

Receptionist_registers: keeps track of which patients have been registered by the receptionist. Initial value is zero until patient is registered and increases as patients are registered.

Declared_office: keeps track of which office is assigned to the registered patient. Initial value is zero and increases as patients file into waiting room.

Receptionist_leaves: keeps track of when the receptionist is available.

Patient_waiting[]: keeps tracks of patients int eh waiting room (per office). Initial value is the same as the doctor count (one room per doctor).

Nurse_notified[]: keeps track of when the nurse has been notified of a new patient. Initial value is the same as the doctor count (one nurse per doctor).

Nurse_available[]: keeps track of when a nurse is available to direct a patient. Initial value is the same as the doctor count (one nurse per doctor).

Nurse_directs_to_office[]: keeps track of when patients have been directed to the declared office. Initial value is the same as the doctor count (one nurse per doctor).

Patient_waits_in_office[]: keeps track of waiting patients in declared office. Initial value is zero but increases as patients come in.

Doctor_notified[]: keeps tracks of when doctor has been notified by nurse. Initial value is zero but can increase up to the number of declared doctors.

Doctor_available[]: keeps track of when a doctor is available to see patient. Initial value is zero but can increase up to the number of declared doctors.

Doctor_listens_to_symptoms[]: keeps track of if the patient has explained their symptoms to the doctor yet. Initial value is zero but can increase up to the number of declared doctors.

Doctor_advices[]: keeps track of if doctor has given advice to patient. Initial value is zero but can increase up to the number of declared doctors.

Patient_leaves[]: keeps track of if patient has left the clinic. Initial value is one.

Pseudocode

Begin Receptionist thread

Begin doctor thread(s) and nurse thread(s) (each doctor/nurse has own thread)

Begin Patient thread(s) (each patient has own thread)

RECEPTIONIST

Release receptionist_ready

Acquire patient_enters

Acquire Receptionist_registers

Print Patient Registered

Assign office number randomly based on doctor number

Release declared office

Release nurse_notified (with declared office number)

Acquire receptionist_leaves

DOCTOR

Release doctor_available (with doctor ID)

Acquire doctor_notified (with doctor ID)

Acquire patient_waits_in_office (with assigned doctor ID)

Acquire doctor_listens_to_symptoms (with doctor ID)

Release doctor_advices (with doctor ID)

NURSE

Release nurse_available (with nurse ID)

Acquire patient_waiting (with nurse ID)

Acquire nurse_notified (with nurse ID)

Acquire patient_leaves (with nurse ID)

Print Nurse takes patients to declared office

Release nurse_directs_to_office (with nurse ID)

Release doctor_notified (with nurse ID)

PATIENT

Acquire receptionist_ready

Release patient_enters

Print Patient enters room

Register patient with patient ID

Release receptionist_registers

Acquire declared_office

Print Patient leaves receptionist and sits in waiting room

Release receptionist_leaves

Release patient_waiting (with assigned office)

Acquire nurse_available (with assigned office)

Acquire nurse_directs_to_office (with assigned office)

Print Patient enters doctors office

Release patient_waits_in_office (with assigned office)

Acquire doctor_available (with assigned office)

Release doctor_listens_to_symptoms (with assigned office)

Acquire doctor_advises (with assigned office)

Print Patient receives advice

Print Patient leaves

Release patient_leaves (with assigned office)