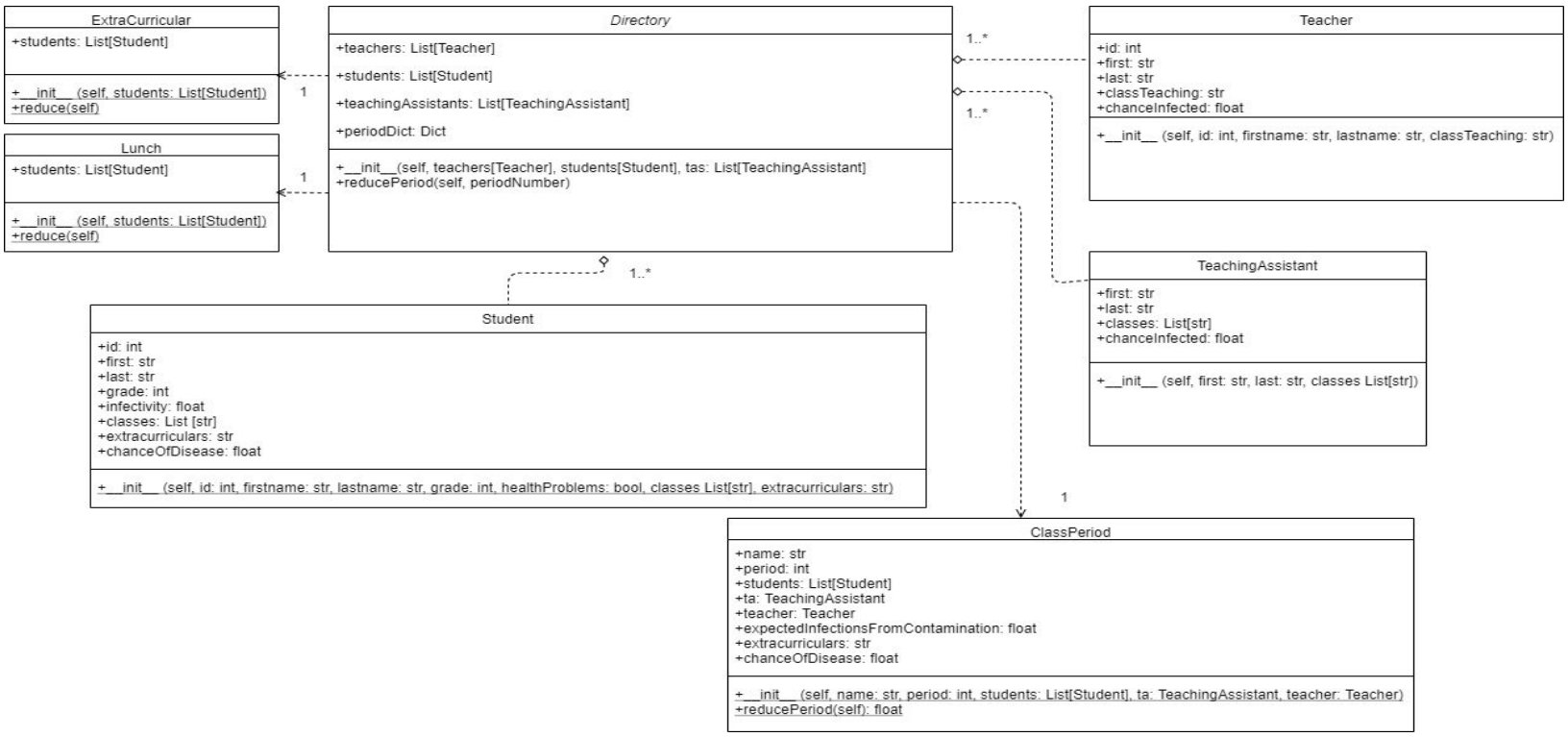
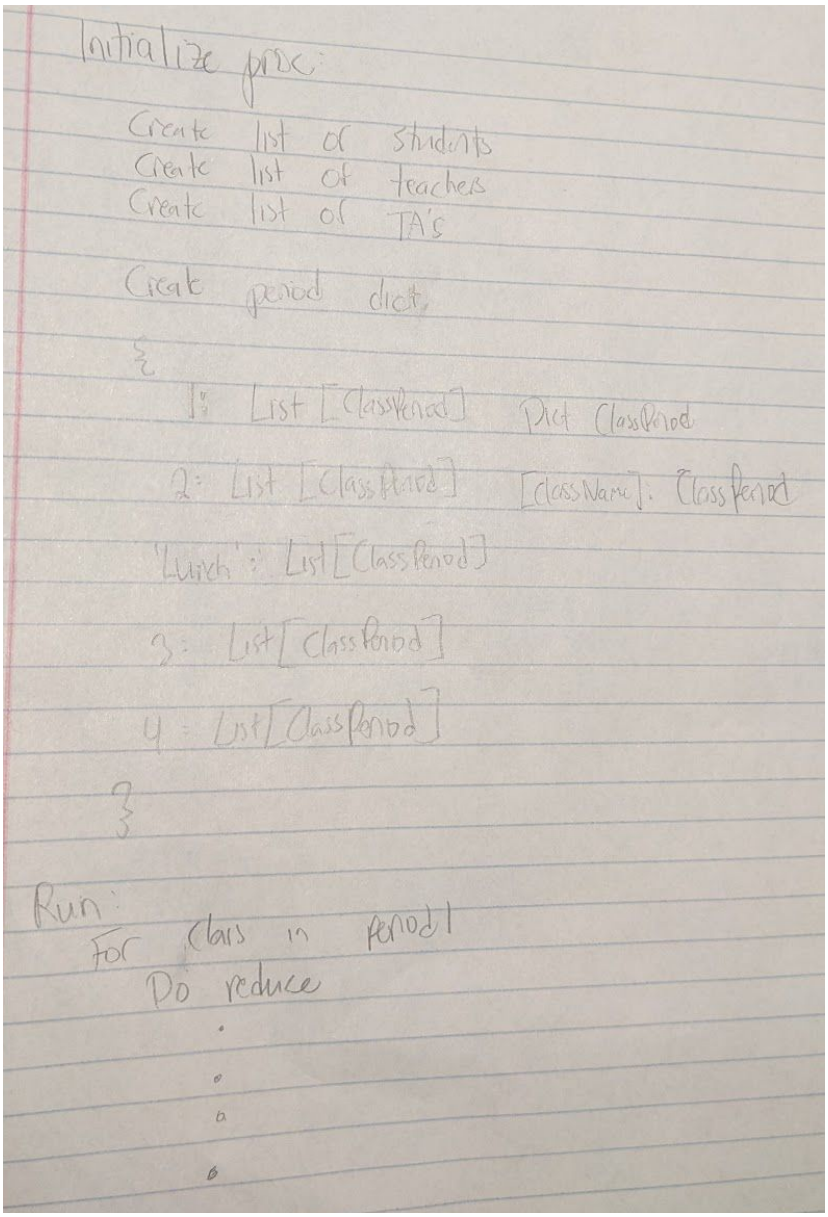
OEC2021-TEAM-C#: Planning Document

UML Structure



Rough Notes


Initialize proc:
Create list of students
Create list of teaches
Create list of TA's
Create period dict,
{
1: List [ClassPeriod] Dict ClassPeriod
2: List [ClassPeriod] [ClassName]: ClassPeriod
'Lunch': List[ClassPeriod]
3: List[ClassPeriod]
4: List[ClassPeriod]
}
Run:
For class in period1
Do reduce

Algorithm:

Create a list of classes
assign students to classes
assign TA to class
create 'var': number of people students infects
go through each student
add 3 x chance infected for each student
to the variable for r0 value
create var: number of people teacher infects
3 x chance teacher has
create var: number of people TA infects 3x chance
TA has

Go through the students array:
increase their chance infected by:

$$\left(\frac{\#\text{ students infect}}{\#\text{ students}} + \frac{\#\text{ teacher infect}}{\#\text{ students}} \cdot \text{Teacher-student mult} + \frac{\#\text{ TA infects}}{\#\#\text{ students}} \cdot \text{TA mult}\right) \cdot \text{infectivity}$$

-Repeat
-Store in the objects?
update infected chance by adding? Math.min(1, newInfectedChance)

Data, objects:

Classes: Dict [str, bool / number?]
{
className: [infected bool] ← if someone is infected and is in room set to true. Maybe change to number on [0, 1]
}

Students at period

Students[ ]: array of students
Teacher[ ]: array of teachers
TA[ ]: array of TA

Student: {
id: number
grade: number
infectivity: number ∈ some parameter based off age & health conds
classes: str[ ]
extracurricular: str[ ]
chanceOfDisease: numbe ∈ [0, 1] for specific instance of time
}

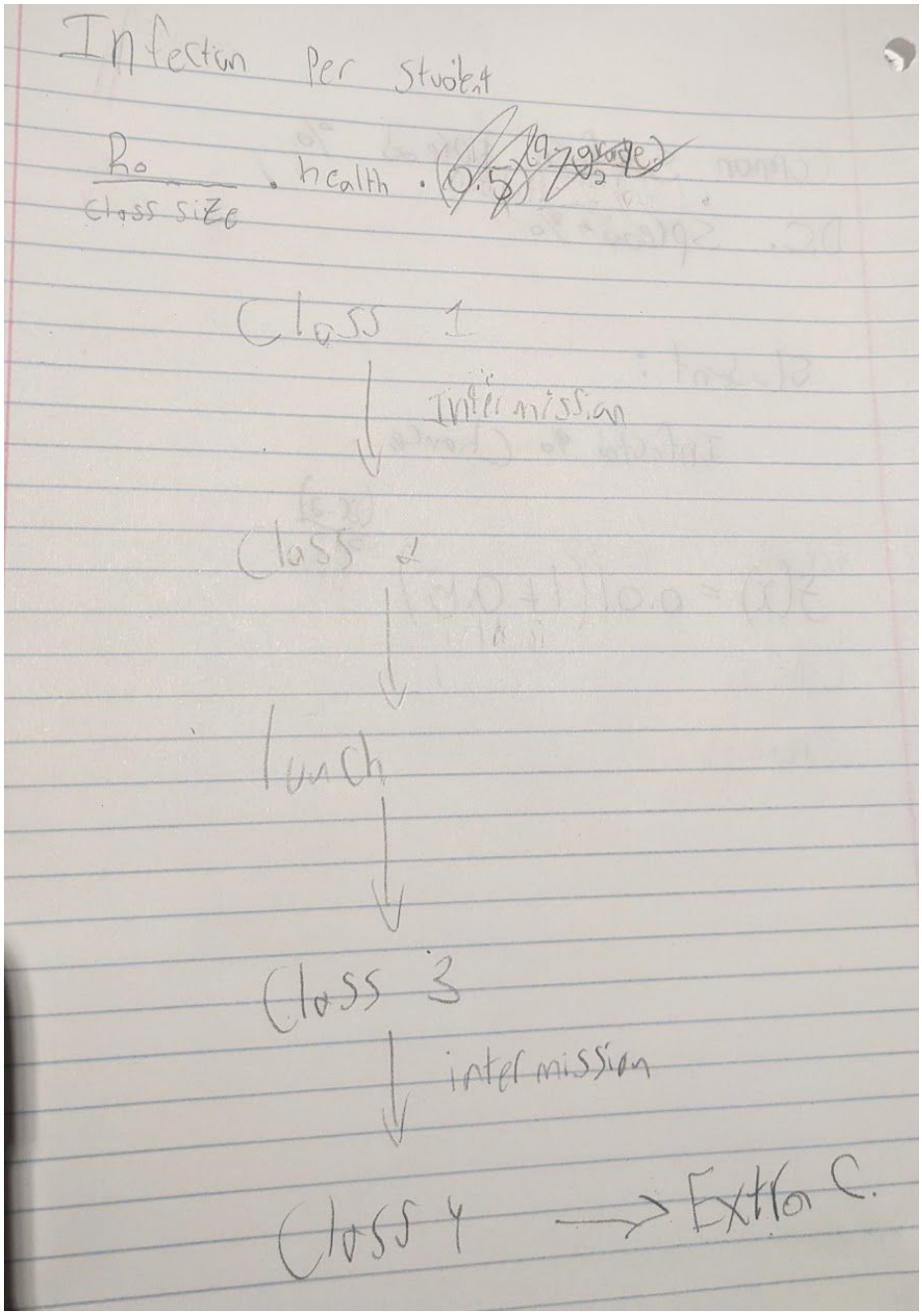
$$1 - \left((1 - \%\text{ infected})(1 - \%\text{ infected}) \right)$$

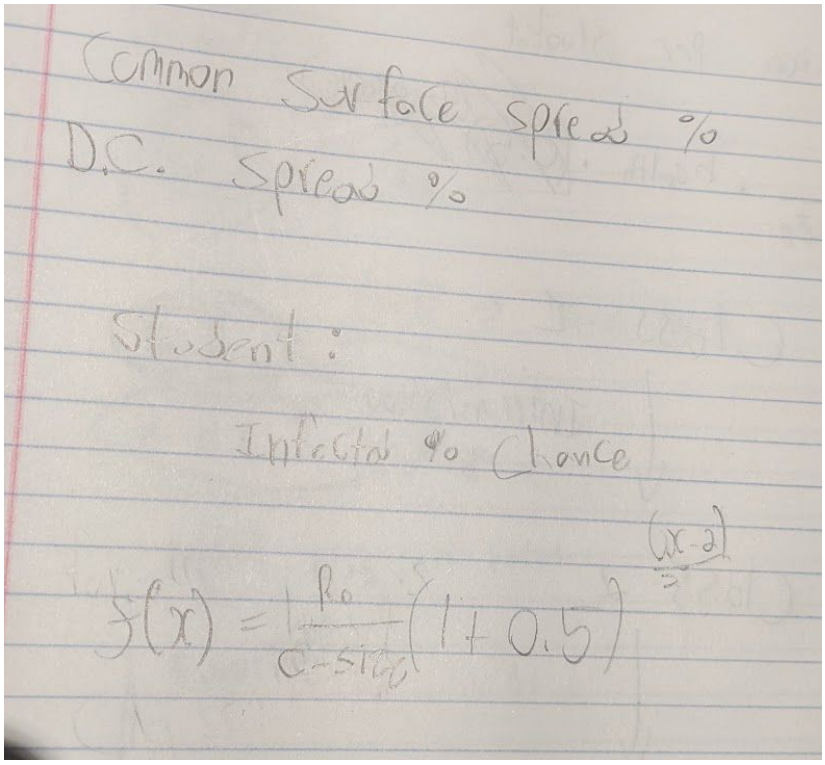
Teacher: {
  id: number
  Class: str
  infectivity: number parameter multiplier based off age
  chanceInfected: number
}

Teaching Assistant {
  name: str
  classes: str[]
  infectivity: multiplier based off age
  chanceInfected: number
}

Class: {
  name:
  students[]
  TA
  Teacher
  Period
  infectedMultplier: number
}

can have free period as well


Infection per student
$\frac{R_0}{\text{class size}}$. health .
Class 1
Intermission
Class 2
lunch
Class 3
intermission
Class 4 → Extra C.



Language: Python
We chose to use python as our language as python is good at manipulating data which is one of the main requirements of this competition.

Calculating the Percent Chance of Infection:
We decided to separately calculate the percent chance of infection based on each “period” of infection linearly with time. The chance of infection for any class is directly based on the previous period as students could have received the virus during a previous period.