Smart Invigilator Allocation System

User Manual

National University of Singapore – ISS

Master of Technology

Intelligent Reasoning Systems – Group Project

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SIAS-GRP Project Team Members

Narendernath Baskar	A0230120J
Yusuf Pranggonoh	A0229966J
Neoh Shi Kang	A0229965L
Tan Wee Han	A0125244N

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1. Objective

Objective of this document is to help the users to navigate and use the functions of “Smart Invigilator Allocation System” application.

2. Dependencies

It is assumed that the “Smart Invigilator Allocation System” application and the dependencies are installed as per the Installation guide provided in the package.

3. Start Services for SIAS Application

Services for SIAS application should be started in this sequence: Scheduler -> Backend -> Frontend

Step-1: Start the Scheduler
Open a new Terminal and execute the following commands

```
cd /sias/scheduler/code-with-quarkus
./mvnw compile quarkus:dev
```

After starting the Scheduler the text similar to below screenshot will be seen in the terminal.

```
__  ____  __  _____   ___  __ ____  ______
 --/ __ \/ / / / _ | / _ \/ //_/ / / / __/
 -/ /_/ / /_/ / __ |/ , _/ ,< / /_/ /\ \
--\___\_\____/_/ |_/_/|_/_/|_|\____/___/
2021-04-30 22:01:15,124 INFO  [io.quarkus] (Quarkus Main Thread) code-with-quark
us 1.0.0-SNAPSHOT on JVM (powered by Quarkus 1.13.2.Final) started in 1.817s. Li
stening on: http://localhost:8080
2021-04-30 22:01:15,127 INFO  [io.quarkus] (Quarkus Main Thread) Profile dev act
ivated. Live Coding activated.
2021-04-30 22:01:15,127 INFO  [io.quarkus] (Quarkus Main Thread) Installed featu
res: [cdi, optaplanner, optaplanner-jackson, resteasy, resteasy-jackson]
```

Step-2: Start the Backend
Open a new Terminal and execute the following commands

```
cd /sias/backend
conda activate sias
python app.py
```

After starting the backend application, the below text will be seen in the terminal.

```
 * Serving Flask app "app" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deploym
ent.
   Use a production WSGI server instead.
 * Debug mode: off
 * Running on http://0.0.0.0:5000/ (Press CTRL+C to quit)
```

Step-3: Start the Frontend

Open a new Terminal and execute the following commands

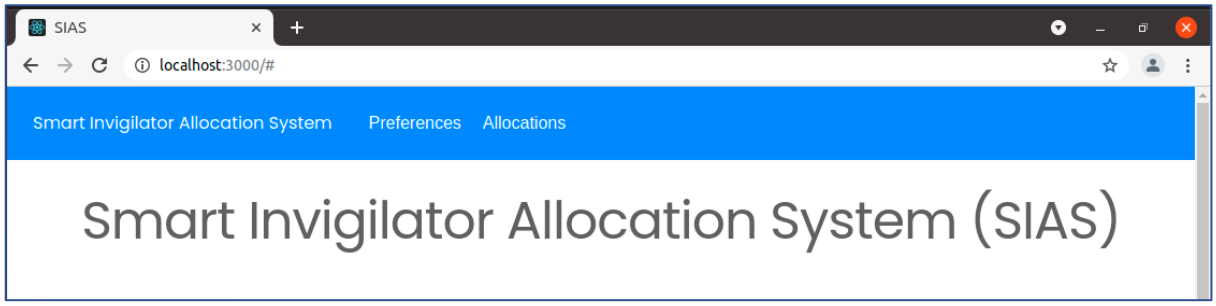
```
cd /sias/frontend
npm start
```

After starting the frontend application, the below text will be seen in the terminal.

```
Compiled successfully!

You can now view my-app in the browser.

  Local:            http://localhost:3000
  On Your Network:  http://10.0.2.15:3000

Note that the development build is not optimized.
To create a production build, use npm run build.
```

Upon starting the Frontend, the default browser will open up the SIAS application. If not opened, you can open your browser and go to the link: http://localhost:3000

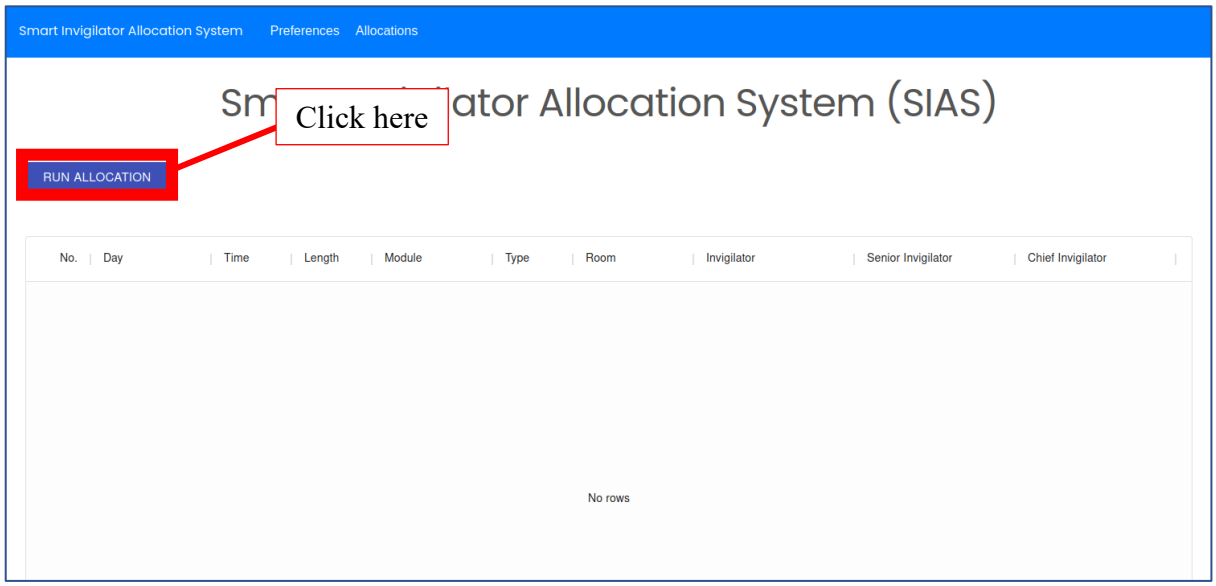
The below page will be displayed.



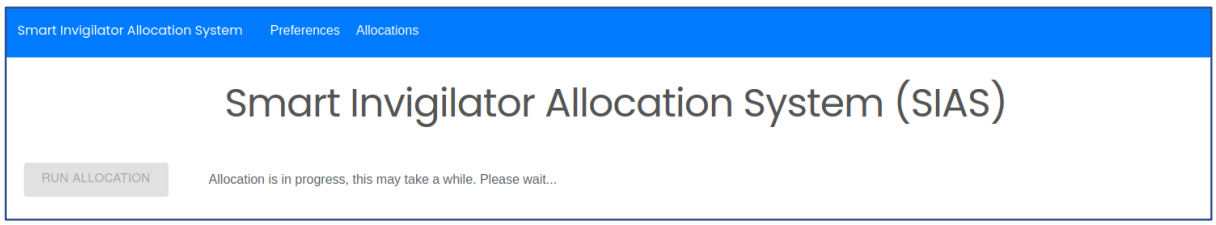
4. SIAS Application Navigation and Usage

2.1 Obtain the Invigilation Schedule

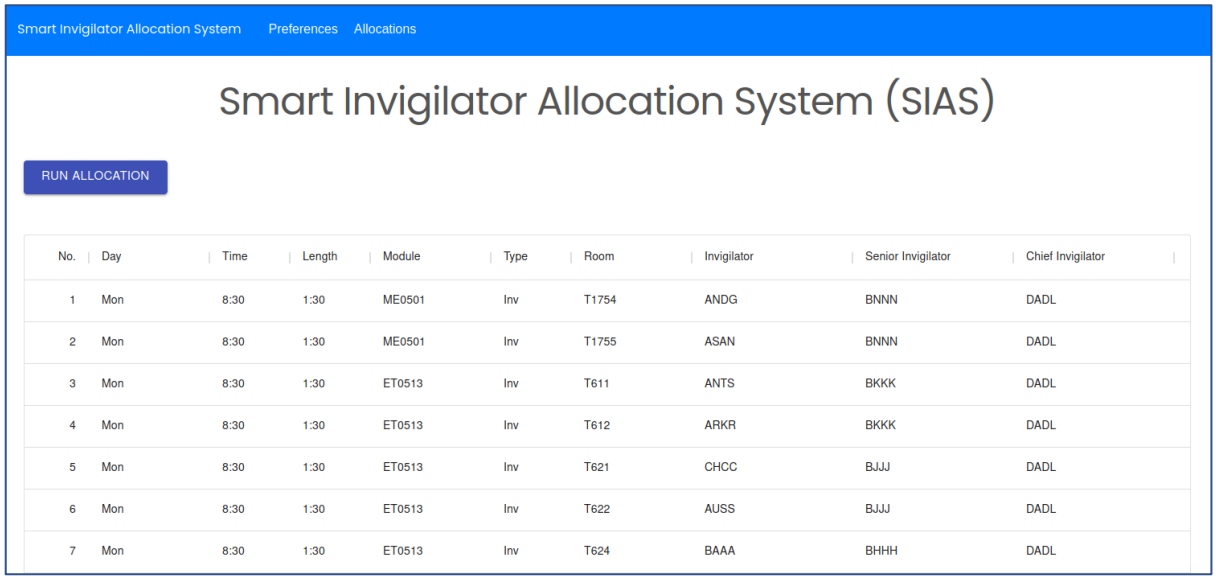
1. On the browser, the SIAS "Allocation" page is displayed showing a blank table. This is because the scheduling is not done. To run the SIAS scheduler and obtain a schedule, click on the "RUN ALLOCATION" button.



2. Upon clicking the button, you should see the following message in the browser: "Allocation is in progress, this may take a while. Please wait..."



3. When the allocation is complete, you will see that the table that was previously blank is now populated.



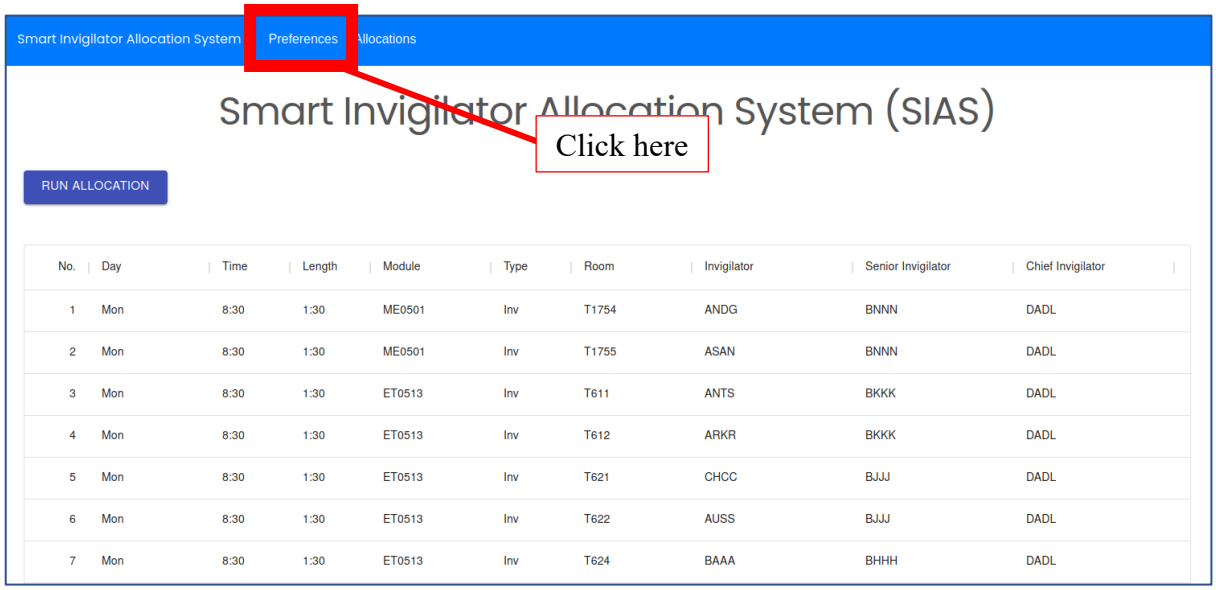
No.	Day	Time	Length	Module	Type	Room	Invigilator	Senior Invigilator	Chief Invigilator
1	Mon	8:30	1:30	ME0501	Inv	T1754	ANDG	BNNN	DADL
2	Mon	8:30	1:30	ME0501	Inv	T1755	ASAN	BNNN	DADL
3	Mon	8:30	1:30	ET0513	Inv	T611	ANTS	BKKK	DADL
4	Mon	8:30	1:30	ET0513	Inv	T612	ARKR	BKKK	DADL
5	Mon	8:30	1:30	ET0513	Inv	T621	CHCC	BJJJ	DADL
6	Mon	8:30	1:30	ET0513	Inv	T622	AUSS	BJJJ	DADL
7	Mon	8:30	1:30	ET0513	Inv	T624	BAAA	BHHH	DADL

4. Taking a look at the terminal running the Scheduler, you can see the scheduler output such as time spent and score.

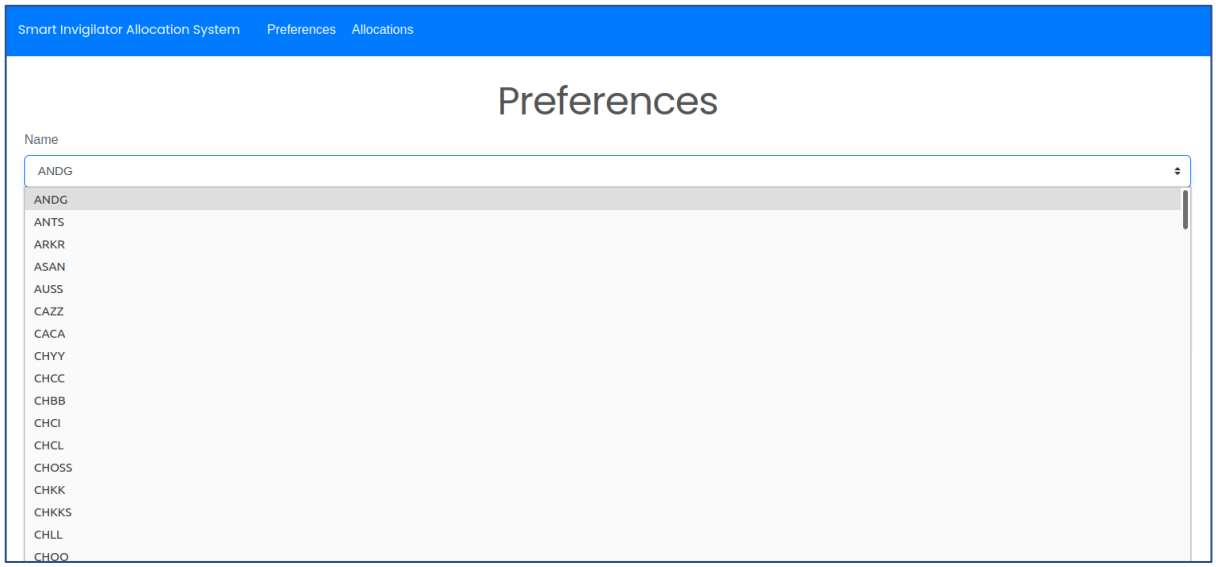
```
2021-04-30 22:13:49,827 INFO  [org.opt.cor.imp.sol.DefaultSolver] (pool-4-thread
-1) Solving started: time spent (53), best score (-390init/0hard/0soft), environ
ment mode (REPRODUCIBLE), move thread count (NONE), random (JDK with seed 0).
2021-04-30 22:13:54,772 INFO  [org.opt.cor.imp.con.DefaultConstructionHeuristicP
hase] (pool-4-thread-1) Construction Heuristic phase (0) ended: time spent (5001
), best score (-313init/0hard/0soft), score calculation speed (2110/sec), step t
otal (77).
2021-04-30 22:13:54,776 INFO  [org.opt.cor.imp.sol.DefaultSolver] (pool-4-thread
-1) Solving ended: time spent (5005), best score (-313init/0hard/0soft), score c
alculation speed (2083/sec), phase total (2), environment mode (REPRODUCIBLE), m
ove thread count (NONE).
```

2.2 Adding Invigilator Preferences to the Schedule

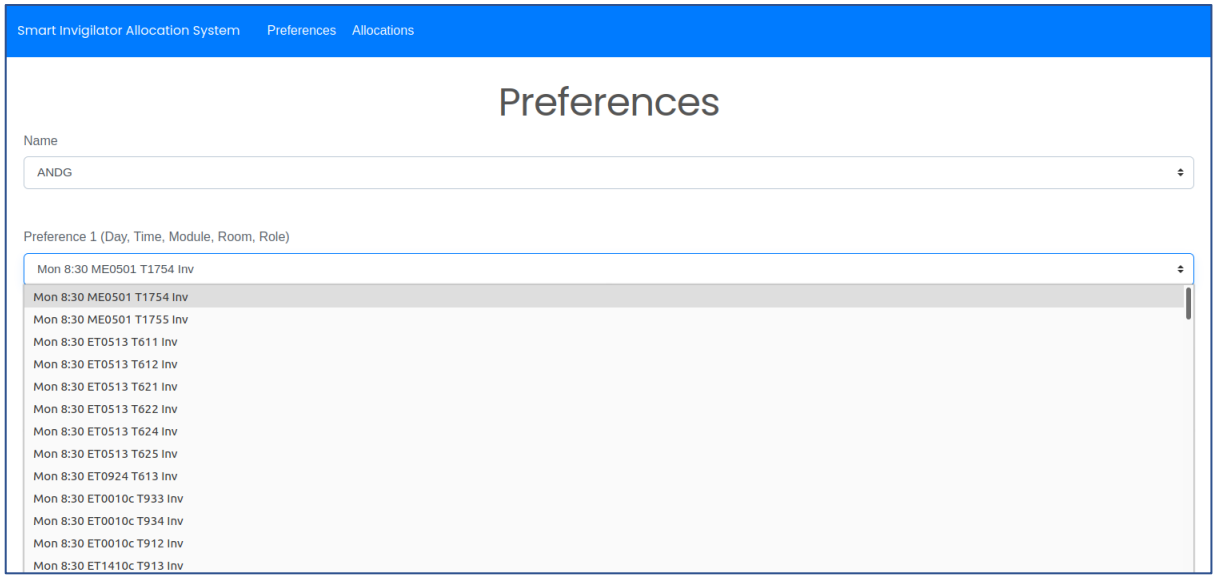
1. Other than the Duty schedule and Staff list, SIAS also takes into account of each Staff's preferences for the invigilation duties. To add in preferences, first, click on "Preferences" in the header bar.



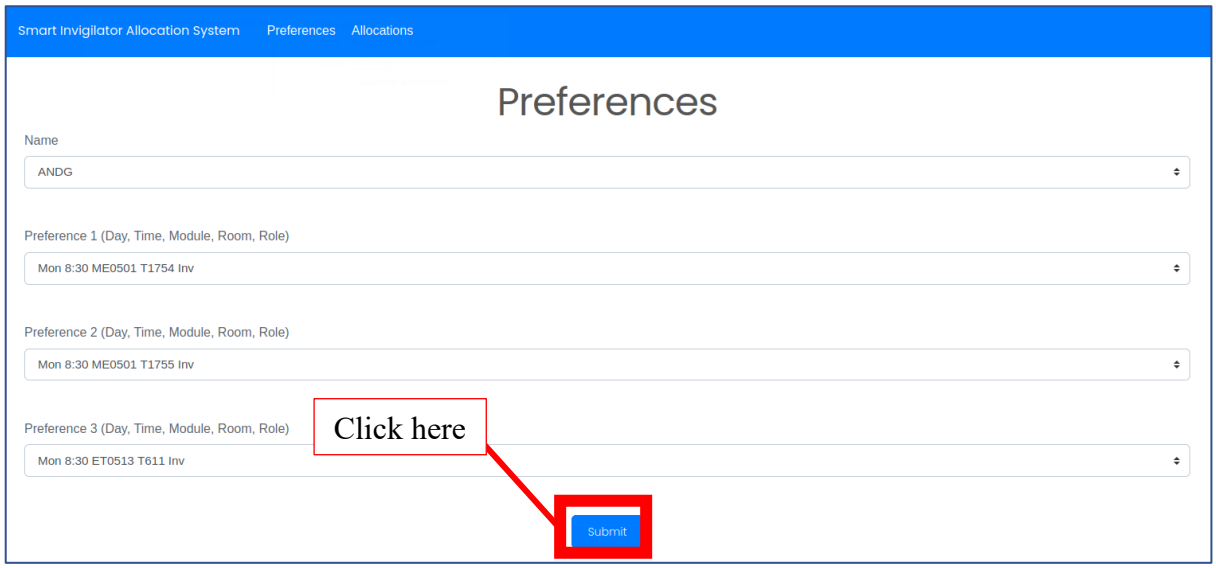
2. In the "Preferences" page, select the Staff in the "Name" section.

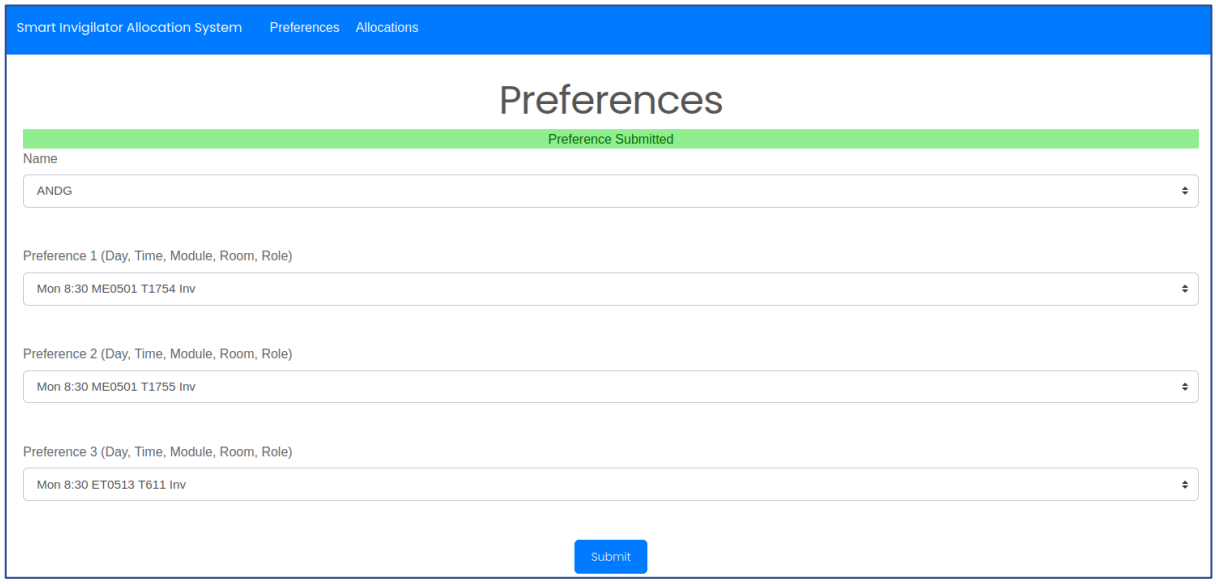


3. Then, select the 3 preferred duties for the Staff selected. The duties are labeled by "Day, Time, Module, Room, Role". (Note that all 3 preferences are given the same priority. Earlier submissions are given higher priorities.)

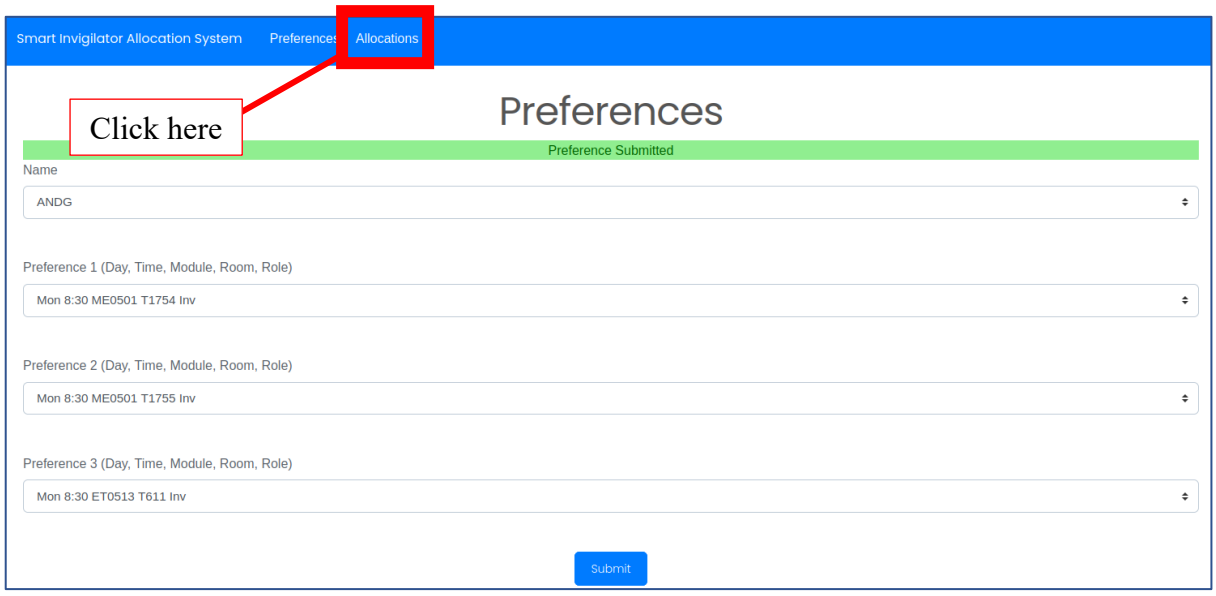


4. Then click "Submit" to add the Staff's preferences into the database. You should see a message "Preference Submitted".





5. After preferences for all Staff are added into the database, the invigilation schedule can be obtained again with Staff's preferences taken into account. Click on "Allocations" in the header bar to return to the "Allocations" page.



6. After running the scheduler with preferences added, you will see that the soft score has increased, meaning that some preferences have been met.

```
2021-04-30 22:16:55,694 INFO  [org.opt.cor.imp.sol.DefaultSolver] (pool-4-thread
-1) Solving started: time spent (2), best score (-390init/0hard/0soft), environm
ent mode (REPRODUCIBLE), move thread count (NONE), random (JDK with seed 0).
2021-04-30 22:17:00,694 INFO  [org.opt.cor.imp.con.DefaultConstructionHeuristicP
hase] (pool-4-thread-1) Construction Heuristic phase (0) ended: time spent (5002
), best score (-313init/0hard/272soft), score calculation speed (2073/sec), step
 total (77).
2021-04-30 22:17:00,696 INFO  [org.opt.cor.imp.sol.DefaultSolver] (pool-4-thread
-1) Solving ended: time spent (5004), best score (-313init/0hard/272soft), score
 calculation speed (2072/sec), phase total (2), environment mode (REPRODUCIBLE),
 move thread count (NONE).
```