2022 Regional IT Collegiate Conference

**Systems Analysis and Design Competition**

**Do not put your name(s) or your school’s name on anything that you submit.  
Doing so will result in disqualification of your team.  
The only identifying information you should use is your team number.**

International Student Accommodation (**ISA**) Information System

A few weeks before the Midwest State University (**MSU**) Fall semester starts, many international students pack and get on their flight to Middleland, Missouri, where their journey to study abroad begins. Many of them are first time international travelers and need help to settle in a totally new environment. MSU International Student Accommodation (**ISA**) office provides necessary accommodation to get these students ready for school. ISA needs an information system to help them better organize their work, track progress and report performance. Your team is assigned to analyze their information requirements, translate information requirements into design specifications.

**ISA tasks:**

1) New student sign-up

Before travel to US, each admitted international student is asked to go to a web site (already exist) and input the following information:

**Personal**: Name, gender, birthday, organization, address  
**admission information**: school, major,   
**Travel info**: airline, flight number, arrival time, airport , need or not airport pickup  
**Lodging**: having temporary living place? If so what is the address and contact person.

Information input must be done no later than a week before travel.

2) pickup students from Airport

2.1 prepare for airport pick up:

ISA needs a new system to fetch the travel information from the web system (step 1) and divide them into groups by their flight time. The first rule of grouping is to put 8 people in each group. The reason mainly is that the transportation vehicle can take maximum 8 people with luggage in one trip. And at same time to take more student in a single trip and use less trips overall.

If the arrival time of 2 flights is close, then the early group will wait for the late group and go together (when the early group has less than 8 people). Flight arrival time within 1 hour is considered close. Depending on the number of students arrived, there were busy days like 7 groups picked up in a day or quiet days like one group picked up in a day. The system can start the process of generating groups anytime an administrator triggers the function. The system should also check the travel data and send reminders to administrators when the earliest flight time is close. Say a week before the first flight arrival.

The system will assign 2 team leaders automatically to each group it generated. Any MSU student in good study status can apply to be a voluntary ISA team leader. Right now, the recruitment process is done manually and a volunteering student go to ISA office to apply and get registered by ISA staff. The new system will provide a web function to automate the student leader registration.

ISA admin can track the student leader pool and assignment anytime from the new system.

The 2 student leaders should receive an email and text message notification when the system assigned them to a group. The student leaders drive a van traveling back and forth between airport and a designated lodging place until all groups assigned to them for a day are all picked up.

2.2 Pickup procedure:

After the system generated the groups. The administer can print out the pickup groups for today. The printout shows group information including a list of student names, arrival flight information, temporary lodging (where to drop off), student leaders names and phone number, ISA admin phone number.

Current approach without a good system, the student leaders need to check-in to the ISA office at least one hour earlier than the group pick up time and get the group info printout assigned to them. Then they check out a van from carpool office and drive it to the airport.

The check-in procedure will be replaced by a self-check-in function in the new system. The leaders no longer need to physically check-in to ISA office but instead can use a mobile device to finish a self-check-in. Plus, the leader will automatically see the current pickup list and future pickup list assigned to them immediately after they finished the self-check-in.

At the airport, the leaders try to pick up everybody on the list and take them to lodging. The leader checkmark “finish” on every person who has been dropped off to lodging. The leader will report immediately the “not arrived” to ISA administrator. In case of flight delay, the leaders need to notify ISA office and very possibly the leader will wait until the flight arrival. In a rare case, the flight is delayed too much then the student leaders can go back and do the pickup the next day.

The leaders will track every student for their pickup status including “dropped off (must include location and room number)”, “late arrival (must include actual arrival time) and dropped off”, and “pickup failed for no show-up”. More importantly in the new system, the leaders no longer use pen and paper but use a mobile device to immediately input the latest pickup information to the system. The new approach is supposedly to greatly reduce the communication time and inefficiency before the student leaders and ISA office.

The system can track the total working hours of each leader.

The system can track students’ current status real time.

3) The 2nd day activities

The 2nd day activities for arrived international students include

1. Activate MSU student account for accessing MSU computer systems
2. open a bank account,
3. find a leasing home,
4. buy a cell phone with a number and
5. grocery shopping.

* Grouping

In case of having many students for 2nd day activities, the system will generate groups again and assign student leaders just like in the airport pickup process. Each group led student leaders to finish these activities. The general rule of generating groups this time include:

1. leasing home preference like distance to campus, price range, roommate or private, and so on. This information should have been input to the system during the airport pickup procedure. During the pickup, either the leader surveys the students and input the info for them, or the leader share the input website address and the students input the info themselves.
2. If leasing home preference is missing or a student find no match, the 2nd rule is by flight info. Arrived in same flight can be grouped.
3. The last rule is lodging room number. Staying in same room may indicate friendship.

A group has 4 to 6 students and 1 or 2 group leaders. The system generates the group with assigned leaders. The ISA office can go to the system and overwrite the system generated group, and assign, remove and reassign leaders. The grouping result should be ready and send to participates before 8:00am 2nd day.

* Progress tracking

During each activity, the leader should use the new system to check in each student at the beginning and checkmark each activity when a student finish it. Information needs to be retained by the system include student’s ID number, phone number, leasing home address.

* Find leasing home

Student leader takes the group to tour 2 rental places and help them sign a contract

Leader will check in each student at the beginning and checkmark each activity when a student finish it. When a student sign a contract, the student’s address should be recorded by the leader. (Immigration office require those info).

* cell phone shop

Leader will check in each student at the beginning and checkmark each activity when a student finish it. The phone is tested and work well. Student’s number must be recorded by the leader. (Immigration office require those info).

* grocery shopping

Walmart and Asian market are included. Leader will check in each student at the beginning and checkmark each activity when a student finish it.

* Additional

ISA office can reassign a student to another group at any time

Student leader sign off from a group when finished, then the system is ready the assign the leader to another group. The system should assign student leaders in turn so that balance the workload among them.

Your team has been asked to help ISA office design a management information system that can provide the above functionality and that is easy to use by it users, with strong data security protection.

In your solution, the system specification must include elements to assure coverage of necessary functions, clear role definition and function/data access control, and no violation of the  
requirements. Web portal and mobile device will be used and information security control should be seriously considered. Multiple users may log in the system at the same time; therefore, it is important  
to protect the working sessions so that there is no inconsistent data regarding events, members, etc.

**YOUR ASIGNMENT** IS to use only one technique (either Object Oriented OR Structured/Traditional Technique) to specify how the system should operate. If you use a structured technique you must specify the flow of data inside the system. If you use an OO technique, then you must specify the classes inside the system and how they are used in order to achieve the system’s objectives.

**WHAT TO TURN IN:**  
If you are using the **structured/traditional approach**, then you are expected to turn in the  
following:  
1. A Context Diagram.  
2. A level 0 (zero) Dataflow Diagram.  
3. A Level 1 DFD for each one of the processes that you identified in your Level 0 System DFD.  
4. Process descriptions for the processes contained in your DFD’s.  
5. An Entity Relationship Diagram (ERD) showing the 3rd Normal Form Database that will  
support the system you designed.  
6. Prototype with Windows Forms and/or Web Pages.

If you are using an **Object-Oriented approach**, then you are expected to turn-in the following:

1. Use-case Diagrams.  
2. Use-case Descriptions.  
3. Sequence and/or Activity Diagrams.  
4. A Class Diagram (for objects in persistence storage).  
5. State machine diagrams.  
6. Prototype with Windows Forms and/or Web Pages.

For creating models, you may use your own business modeling software. This could include any CASE, I-CASE or other model-based development product. **ALL SUBMISSIONS FOR JUDGING MUST BE SAVED IN A SINGLE PDF FILE** so that the judges can view your work.

The prototype must be developed based on your models. It does not have to be fully implemented; however, a system design that provides mocked-up screens with window form/web page interaction will be considered in the over-all grading. The screens can be created using any graphical drawing software (such as Microsoft Paint or Photoshop) or you can take screen shots from development tools (such as Microsoft Visual Studio, Access or Eclipse). Given the time limit of the contest, handwritten mock-ups are allowed; however, the screens created by computer software will be given better grades. **AGAIN, ANY IMAGES OR DOCUMENTS YOU PREPARE MUST BE SAVED IN PDF FORM FOR JUDGING.**

When submit your work, make sure you submit **only one pdf file through the contest LMS**. Do  
not include any identifying information about yourself or your college. **ONLY** type **your team  
number** on your submission. If your submission contains any personal or college information,  
your team will be disqualified.

**Contest Evaluation**

The judges will use the following categories as they evaluate your team’s recommended solution. The models that your team will be required to develop depend on which methodology  
is selected.

NOTE: Competitors are expected to utilize ONE and ONLY ONE Analysis and Design approach. Using a combination of components from both the Structured/Information Engineering approach and the Object-Oriented approach should be avoided.

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|  | **%** | **Structured/Info. Engineering** | **Object-Oriented Approach** |
| **Information Flow** | **30** | Decomposition, DFD's, Dependency and Process Action Diagrams. | Use Cases, Sequence and/or Activity Diagrams |
| **information Structure** | **30** | Entity Relationship Diagrams (ERD’s) and Data Constraints | Class Diagrams (for objects in persistence storage) and State Charts (State Machine Diagrams) |
| **Prototyping** | **20** | Windows, Screens and/or Web Pages | Windows, Screens and/or Web Pages |
| **Role, access control** | **10** | Design of system roles, authorization, access control | Design of System roles, authorization, access control |
| **Security** | **10** | Consideration of web system security in your design | Consideration of web system security in your design |
| **Overall** | **100** |  |  |