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Design Case**

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Teaching Case

MiHotel: Applicant Processing System Design Case

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ABSTRACT

This teaching case describes the functionality of an applicant processing system designed for a fictitious hotel chain. The system detailed in the case includes a webform where applicants complete and submit job applications. The system also includes a desktop application used by hotel managers and Human Resources to track applications and process job offers. Both the webform and the desktop application share a centralized database. The case is based on an actual systems development project that students completed for a real hotel chain. Material in the case can be used for assignments in systems analysis and design, database management, and web design courses. Teaching notes, including an entity-relationship diagram (ERD), data dictionary, data flow diagrams, job application form, prototype screenshots, and discussion questions are available through the JISE website.

Keywords: Database design & development, Entity-relationship modeling/diagram, Systems analysis & design, Data flow diagram, Web design & development, Teaching case

1. INTRODUCTION

MiHotel is a mid-range hotel chain that started in Traverse City, Michigan, in 1980. The chain offers three-star service and moderately-priced rooms at its 15 hotels throughout Michigan. MiHotel has plans for a major expansion, building three new hotels in the next three years. As a part of the expansion, the company will be hiring dozens of employees for each new hotel.

MiHotel's Human Resources (HR) department has decided that the existing online application process is insufficient to handle the demand created by the company's expansion plans. As such, they have decided to implement a new applicant processing system to better meet the needs of their growing company.

2. BACKGROUND

For this case, the students will assume the role of systems analysts responsible for designing a system to track and process applicants for MiHotel. There are two parts to the system design. The first part is a webform to capture applicant data. The second part is a desktop application used by hotel managers and HR to post open positions, search applicant data, record interview/reference data, make offers, and record applicant responses. The students will design the relational data model needed to support both parts of the system along with the data flow diagram.

3. CASE TEXT

3.1 Overview of the Current Application Process

A person wishing to apply for a job with MiHotel currently has to fill out a form on MiHotel's website. This form contains fields to enter personal information, employment history, educational background, and professional references. MiHotel's HR department receives a system-generated email when the applicant completes the webform. The webform has no security or encryption and only limited data validity checks. Because the form generates an email that just lists key-value pairs, it is not possible to search or sort by any criteria except by manually copying the text from the email into another program such as Microsoft Excel.

MiHotel's employees currently print these "application emails" and place them into file folders. HR employees can send these emails to other employees, including but not limited to hotel managers and MiHotel executives.

Although the current process has worked for MiHotel in the past, it is too labor-intensive and time-consuming to handle the number of applications expected as the company expands. Therefore, the HR department has decided to replace the process with a new system that will make applicant processing more efficient. This new system will have a revised webform to capture applicant data along with a desktop application that can be used to search applicants, extend offers, and record applicant responses. The following sections detail the functions of the new system.

3.2 Human Resources – Creating a Job Posting

For MiHotel, the hiring process begins when HR creates a new job posting. In the current process, the posting is simply a static webpage with a button that directs applicants to the application webform. Given the number of positions to fill, creating webpages for each new posting would be too time-consuming. For this reason, HR would like to enter posting data directly into the new system's desktop application. The posting data would then be stored in a centralized database. The web-based application form would link to the database in order to display open positions.

In order to create a job posting, an HR employee must first sign-in to the desktop application using his/her username and password. Once signed in, the system presents the HR employee with a menu containing buttons to add/update a job posting, view pending offers, and add/update employees. By clicking the "Add/Update Posting" button, the system takes the HR employee to a form where a new posting can be added or an existing posting updated. When adding a posting, the HR department wants to be able to select the hotel and position from dropdown lists. This means that all hotels and positions will need to be stored in the database. Given that MiHotel is planning an expansion, the desktop application will have to allow HR to add new hotels and any new positions to the database, as necessary.

Once an HR employee has created a posting in the desktop application, the revised application webform will display it in a dropdown list along with any other open postings. Applicants will be able to apply for specific positions by selecting from this list when they complete the webform.

3.3 Applicant – Submitting an Application

When a person decides to apply for a particular position at MiHotel, upon clicking an "Apply" button on the job listing website, the system prompts them to either sign-in or register. Upon clicking "Sign-in," the system presents the applicant with a standard webform to enter their email address and password. After clicking on "Register," the system presents the applicant with a form to enter their name, email address, and password. The system encrypts passwords and other fields as needed for storage.

A centralized database stores new applicant accounts and verifies those of returning applicants (those with an existing account) based on the email address and password.

After successful registration, the system directs the applicant to the revised application webform. This form will contain the same fields as the current application form but there will be validation checks in place not only to enforce business rules for data, but also range- and bounds-checking. The revised webform will also guard against SQL injection.

The data entered by the applicant is stored in the database and linked to the job posting by job posting ID. An applicant can always check on the status of their application by signing in to the website and clicking the "Check Status" button. With the application submitted, the workflow now shifts to the hotel manager who reviews the application.

3.4 Hotel Manager – Reviewing Applications

At MiHotel, hotel managers are responsible for reviewing applications, selecting candidates, conducting interviews, checking references, and making job offers. Given that the

managers will have to staff the new hotels in short order, the new system will need to integrate these disparate tasks into a seamless workflow.

In order to review applications, a hotel manager must first sign-in to the desktop application using his/her username and password. Once signed in, the system presents the manager with a menu containing buttons to either search and update existing applications or view past job offers. By clicking the "Search and Update" button, the system takes the manager to a form that displays a list of all active applications for positions at the manager's location. The list displays a limited selection of fields from the active applications such as application ID, submission date, applicant name, position title, and application status. The form allows the manager to filter the list by either the position title or the applicant's last name. In this way, the manager can quickly filter the applications for a specific position in order to begin the review process.

Since the list provides a limited selection of fields, the manager can double-click on any application to display a form with all of the applicant's data. This form also allows the manager to edit applicant data and update the application as it moves through the hiring process.

After reviewing the applications for a position, the manager chooses a group of qualified applicants to interview. For these applicants, the manager changes the application status from "Applied" (the initial status for all applications) to "Candidate." Managers then interview the candidates over the phone, and their employment references are checked. As the manager completes these tasks, he/she updates the applications to record interview notes and to indicate when reference checks are completed.

3.5 Hotel Manager – Making an Offer

Once the manager interviews the candidates for the position and checks their references, he/she then selects a candidate to offer the job. The manager starts the offer process by updating the candidate's application status to "Offer Requested" and completing the offer form. The offer form requires the manager to specify whether the position is part-time or full-time as well as the pay rate and the starting date. Once completed, the manager submits the offer request, and the offer is stored in the centralized database with a status of "Pending."

HR must approve an offer before sending it to the applicant, therefore, once the manager has submitted the offer request, the workflow shifts to HR. The hotel manager can check the status of requested offers by clicking the "Review Past Offers" button on the main menu.

3.6 Human Resources – Approving an Offer

Although hotel managers decide which candidate should receive a job offer, MiHotel's hiring policy requires that HR review and approve an offer before sending it to the applicant. HR employees will review offers using the same desktop application used by the hotel managers.

Just as with creating a job posting, an HR employee must first sign-in to the application using his/her username and password. Once signed in, the system presents employee with the HR main menu. By clicking the "View Pending Offers" button, the system directs the HR employee to a form that displays a list of pending offers from the hotel managers. The list displays information related to each offer including the

offer ID, offer date, location name, application ID, and position title. The form also allows the HR employee to filter the list by location name or position title.

The HR employee double clicks an offer in the list to begin the review process. This brings up a form with all the offer details, which the employee checks for errors. Specifically, the HR employee is looking for errors in the pay rate, start date, etc. After verifying that the offer is correct, the HR employee performs any necessary background checks on the applicant. The level of background check depends on the type of position and the level of authority. Once the background checks are complete, the HR employee either approves or denies the offer.

If the HR employee approves the offer then the system updates the status of the offer to “Approved.” The system also updates the status of the application to “Offer Made.” Finally, the system sends a dynamically generated email to the applicant. The system retrieves the applicant’s personal details and the job offer details for the email from the centralized database. The email also contains a personalized greeting and a link back to the job portal so the applicant can sign-in and accept or decline the offer.

If the HR employee denies the offer then the system updates the status of the offer to “Denied.” The HR employee then contacts the hotel hiring manager and explains the reason for denying the offer. Based on the reason for the denial, the manager may decide to submit a new offer for the applicant.

3.7 Applicant – Responding to an Offer

When the applicant receives the offer, the email also contains a link to the job portal website. The portal will show the applicant his/her pending offer upon signing in. The system displays offer details such as full- or part-time, start date, and pay rate, as well as the options for the applicant to either “Accept” or “Decline.” Once the applicant clicks either button, the system updates the offer status accordingly and disables the “Accept” and “Decline” buttons. The system then generates an email containing the applicant’s decision (accept or decline) and sends the email to both HR and the hiring hotel manager.

3.8 Hotel Manager – Updating Applications

Once the hiring manager has received the applicant’s response email, he/she will need to sign-in to the desktop application to update the applicant’s application status. If the applicant has accepted the offer, then the system changes his/her application status to “Hired,” while the statuses of all other applications for the position are changed to “Closed.” If the applicant has declined the offer, then his/her application status is changed to “Declined Offer.” The manager can then decide to consider another candidate from the existing applicants or close all applications for the position and have HR re-post the job.

3.9 Human Resources – Closing a Job Posting

When the HR employee receives the applicant’s response to the offer, he/she will need to sign-in to the desktop application to update the offer status to “Accepted” or “Declined.” If the offer was accepted, the HR employee will also need to close the job posting by changing it from active to inactive.

4. ASSIGNMENT

The MiHotel case can be used to develop a number of possible assignments. These assignments can be completed by individuals or groups. They can be used to create multiple homework assignments or one comprehensive system design project. The authors provide examples of possible assignments in Table 1.

Class Activity	Assignment	Deliverables
System requirements lecture, Discuss MiHotel case	Document system requirements	Systems requirements document
ERD lecture, Review MiHotel case and current job application form	Develop data model	ERD, Data Dictionary
DFD lecture, Review MiHotel case	Model system processes	DFD
Website design lecture, SQL injection lecture, Review current job application form	Develop web-based application form	Application webform with SQL injection prevention
User interface design lecture, Review MiHotel case	Develop desktop prototype	Desktop application forms

Table 1. Possible Assignments

5. CONCLUSION

The case presented herein provides numerous opportunities to engage students in a real-world system design problem. Students working as individuals, or in groups, can tackle assignments ranging from documenting requirements to designing databases, websites, and desktop prototypes. The assignments can be stand-alone or combined to create a complete system design project.

The case is based on a systems development project that students completed for a real hotel chain. This means that although MiHotel is a fictitious company, the functionality described in the case is both realistic and complete. Students will benefit from having to design solutions for such a detailed and function-rich case.

AUTHOR BIOGRAPHIES

Robert Miller is an Associate Professor of Information Systems at Central Michigan University. He received his Ph.D. in Information Systems from the University of Arkansas. His current research interests include information systems service quality, social media, and the posting paradox. His publications have appeared in several journals including *Behaviour and Information Technology*, *Information Systems Management*, *Journal of Information Systems Education*, and *MISQ Executive*.



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