

**BOWIE STATE UNIVERSITY  
COMPREHENSIVE EXAMINATION FOR  
MANAGEMENT INFORMATION SYSTEMS  
17 March 2007**

**Instructions:**

The Comprehensive Examination for Management Information Systems is a three hour examination. You must answer one question from Part A (the technical portion of the curriculum) and one question from part B (the management-related portion of the curriculum). You have the option of answering a second question, in either part A or part B, if you are not confident about your first answer. You must pass one question from part A **and** one question from part B to receive a grade of "pass" for the comprehensive examination.

Grading the comprehensive exam requires approximately three weeks. No results will be released until all examinations, in all degree programs, have been graded. Answers to each question are graded "blind" by three faculty members with expertise in the subject matter.

Answers are graded as either "pass" or "fail." "Pass" indicates a minimum grade of B. In the event of a "fail" on the exam written comments from the graders explaining why the student's response was insufficient and what would be required for a passing grade will be supplied to the student.

A set of URL's previously provided describe the general scenario, described in summary below. While the URL's provide additional background to the scenario, the summary below provides sufficient background for good responses to the comprehensive examination questions.

**General Scenario:**

The context for the March, 2007, MIS comprehensive exam is the US Department of Homeland Security's US-VISIT system. The following overview is taken from the DHS online Fact Sheet (DHS, 2006):

The US-VISIT program is the centerpiece of the United States government's efforts to transform our nation's border management and immigration systems in a way that meets the needs and challenges of the 21st century.

US-VISIT is part of a continuum of biometrically-enhanced security measures that begins outside U.S. borders and continues through a visitor's arrival in and departure from the United States. It incorporates eligibility determinations made by the Department of Homeland Security (DHS) and the Department of State.

US-VISIT currently applies to all visitors (with limited exemptions) entering the United States, regardless of country of origin or whether they are traveling on a visa or by air, sea or land. Most visitors experience US-VISIT's biometric procedures – digital, inkless finger scans and digital photograph – upon entry to the United States.

In those cases where a visitor requires a visa, the Department of State collects the visitor's biometric and biographic information through the BioVisa program, which is

then checked against watch lists, thereby improving the Department of State's ability to make a visa determination. When the visitor arrives in the United States, US-VISIT procedures allow the Department of Homeland Security to determine whether the person applying for entry is the same person who was issued the visa by the Department of State, and additional watch list checks improve the Department of Homeland Security's ability to make admissibility decisions.

US-VISIT entry procedures are currently in place at airports and seaports with international arrivals and in the secondary inspection areas of U.S. land border ports of entry.

The URL's provided gave approximately 20 pages of background information. As you answer the questions on the comprehensive exam, please remember that the scoring of your responses will be based on how well you can *apply* what you have learned in the core courses and additional reading of professional literature to specific questions, some of which invite reasonable speculation that outsiders cannot know as fact about what has taken and is taking place. Where speculation is needed in your responses, you should state the assumptions on which the speculation is based. The information provided in this introduction and within the questions themselves should be sufficient to allow you to demonstrate your knowledge and your ability to apply it to what is asked.

### **Reference**

Department of Homeland Security. (2006). Fact Sheet: US-VISIT. Retrieved March 13, 2007, from [http://www.dhs.gov/xnews/releases/pr\\_1160495895724.shtm](http://www.dhs.gov/xnews/releases/pr_1160495895724.shtm).

### **Comprehensive Examination Questions:**

#### **Part A**

(answer at least one question from Part A)

1. The FBI collects all 10 fingerprints from each of approximately 47 million people.
  - a. Demonstrate your knowledge of computer hardware and software by explaining in detail how the capturing and processing (including matching) of fingerprints could reasonably be done by hardware and software working together.
  - b. Demonstrate your knowledge of types of storage devices, and/or how data is stored, by discussing what storage could reasonably be used for the FBI's collection of fingerprints. Recall that the law enforcement and HDS personnel need to be able to receive identification information quickly, before the potential terrorist or criminal gets away. (*Note that this question does NOT ask for database structure; you are to discuss data storage more generally here.*)
2. Whatever system(s) support(s) the US-VISIT program described in the quote that begins on the first page of this exam would be made up of many programs. For each of *two* from among the four "traditional" programming language paradigms (procedural/imperative, object-oriented, functional, logic), discuss what would be its strengths and its weaknesses if used to implement the sub-systems specified below. Be sure to demonstrate your knowledge of the commonly compared characteristics of paradigms/languages within the context of the requirements of the US-VISIT program's information system needs.

- a. Sub-system to receive a visitor's biometric information as he/she is leaving the US. (Assume that this sub-system also needs to instruct the visitor online how to give the biometric information; e.g., look into the retina-scanning device, or put your finger onto the device.)
  - b. Sub-system to maintain indexes for fast lookup comparing biometric characteristics. (*Note that this question is not asking how one would program such with the features available in a database management system – it is really asking you to demonstrate knowledge of behind-scenes data structures and how they might be programmed to support data retrieval.*)
3. In answering this question, you are to demonstrate your knowledge of the hardware and software that comprise networks, both internal within sub-programs and agencies composing or supporting the US-VISIT program and external (read that as US-VISIT program-wide), as appropriate. You are also to demonstrate your awareness and understanding of current issues associated with networks and their uses.
- a. Compare and contrast: network requirements to support border control at one port of entry *vs.* network requirements for communication among all ports of entry and the FBI. Realizing that you don't actually know what is there, speculate convincingly and specifically in the context of the US-VISIT program.
  - b. Discuss *two* disaster planning and recovery issues that could be important in implementation of the network(s) supporting the US-VISIT program. Include discussion of possible solutions. (Note: as you answer this question, be sure to touch on the highly distributed nature of border control.)

## Part B

(answer at least one question from Part B)

4. The “traditional” way in which the government has contracted with private industry for information systems and for tangible goods has been to develop a request for proposal containing “up front” detailed specifications of what is required, and then inviting companies to submit competitive bids to provide the goods and/or services.

Development of the US-VISIT systems, however, has been done more as a “partnership” between DHS and a private “consulting, technology services and outsourcing” company (Accenture).

- a. Demonstrate your knowledge of information systems by giving *three* convincing arguments *in support of* this non-traditional arrangement for development of the US-VISIT system(s).

- b. Demonstrate your knowledge of information systems by giving *three* convincing arguments *against* this lack of competition for development of the US-VISIT system(s).
  
- 5. The US-VISIT system began with a pilot implementation at just a few ports of entry, and later was expanded to include more locations.
  - a. From the perspective of the lead person in charge of systems analysis and design, for *each of three phases* of the SDLC discuss *one* significant issue that likely would have been important in development and implementation of the initial pilot version of the US-VISIT information system(s).
  - b. From the perspective of the lead person in charge of systems analysis and design, for *each of three phases* of the SDLC discuss *one* significant issue that likely would have been important in adding more ports of entry to be supported by the US-VISIT information system(s).
  
- 6. These database questions relate to the exchange of information among the US-VISIT subsystems, and between US-VISIT and the FBI.
  - a. Describe at least *four* significant tables that could be part of the database(s) supporting US-VISIT. Explain how these tables are related, and how they work together to support US-VISIT. Do not spend time giving details of aggregate information. For example, say something inclusive such as “name and location” rather than giving such details as first name, last name, street address, city, country, postal code, area code, etc.
  - b. Explain in convincing detail how to address the needs for security and privacy of individuals as the US-VISIT database(s) is/are/were/could have been designed.
  - c. Discuss in convincing detail *two* database issues (other than security and privacy) that must be addressed to support the communication among the various entities and sub-systems within US-VISIT, and give potential solutions for these issues.