Chapter 2

Business Processes, Information Systems, and Information

Chapter Objectives/Study Questions

- **Q1. What is a business process?**
- **Q2. What is an information system?**
- **Q3. How do business processes and information systems relate?**
- **Q4. How do structured and dynamic processes vary?**
- **Q5. What is information?**
- **Q6. What are necessary data characteristics?**

List of Key Terms

- **Activity** – a task within a business process.
- **Actor** – people or computers that perform activities in a process.
- **Business Process Management Notation** (BPMN) standard – a standardized technique for documenting business processes.
- **Business process** – a sequence of activities for accomplishing a function.
- **Computer-based information system** – an information system that includes a computer as an actor.
- **Computer hardware** – machine actor in an information system.
- **Criteria** – a standard or benchmark upon which a decision is made.
- **Data** – the bridge between the machine-side and human-side of an information system.
- **Dynamic processes** – nonspecific, adaptive, even intuitive collections of activities that are developed to address unstructured problems and opportunities.
- **Five-component framework** – a model of the components of an information system: computer hardware, software, data, procedures, and people.
- **Information** – knowledge derived from data.
- **Information system (IS)** – a group of components that interact to produce information.
- **People** – human actors in an information system.
- **Procedures** – instructions in an information system.
- **Repository** – a collection of records.
- **Role** – a subset of activities performed by an actor in a business process.
- **Software** – a collection of machine instructions in an information system.
- **Structured processes** – formally defined and standardized collections of activities.
- **Swimlane** – a column in a BPMN diagram that identifies all the activities for a particular role.
- **System** – a group of components that interact to achieve a purpose.
- **Unitarianism** – an ethical standard by which the morality of an act is determined by its outcome.

MIS InClass 2

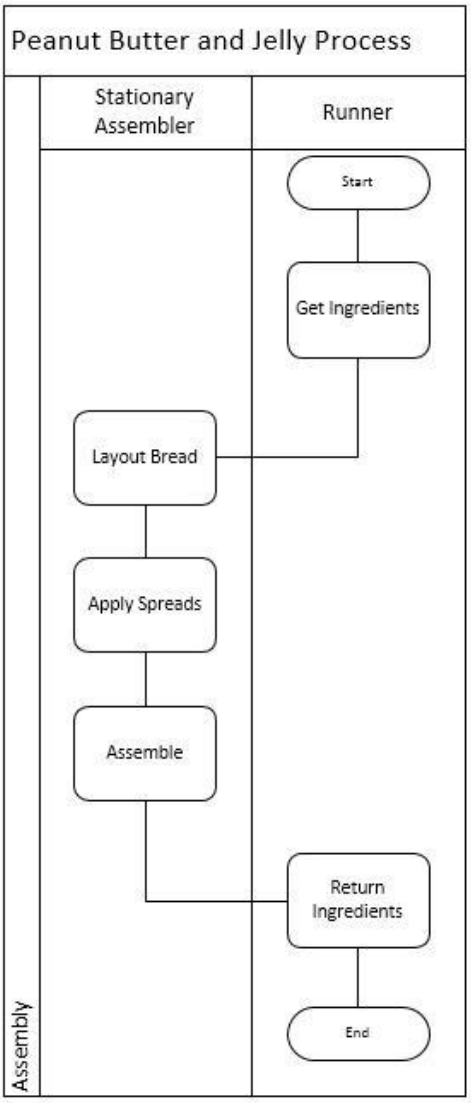
1. **How accurate was the student's activity list? How accurate was your activity list?**
   Student answers will vary. Factors include the student's activity list, the shared activity list, and any special directions or requirements provided by the instructor for the activity.

2. **What makes this apparently simple process challenging to write down?**
   This process is challenging to write down because every student will have his or her own approach to making a sandwich. Some will toast the bread, some will not. Some will put peanut butter and jelly on each slice of bread, while others will place one spread on each slice. Some students may store their bread on the counter, while others may store it in a cupboard or in the refrigerator.

3. **How can a business improve its process of listing activities? If businesses struggle to articulate their activities, what things could be done to help make more accurate activity lists?**
   A business can improve its process of listing activities by creating BPMN diagrams. If a business struggles to articulate their activities, employees could record their actions during the course of a day. As these lists are generated, they can be grouped by business area and formed into activities.

4. **Below your own activity list, make a list of the assumptions you are making. Once complete, share your list and listen to the list of assumptions other students recorded. Are you surprised how many assumptions are necessary?**
   Student answers will vary. Factors include the student's list of assumptions, and the shared assumption lists.

5. **Make a BPMN diagram of the Sandwich Making process. Assume two roles—a stationary assembler and a runner who gets the items from different spots in the kitchen.**

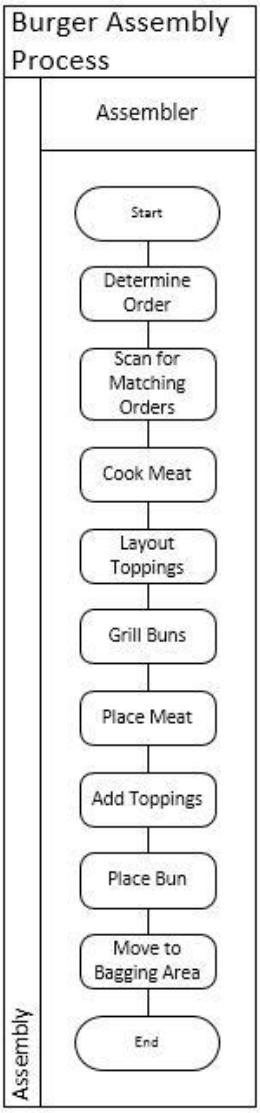


6. **If you operated a small business to make and sell 100 peanut butter and jelly sandwiches a day, would your process be structured or dynamic? What objectives would you specify? What IS might be helpful? For this IS, write down the procedure to use it.**
   The process would be structured. The primary objective would be to produce one sandwich every 20 seconds. The secondary objective would be to sell all 100 sandwiches each day. A sales order system would be helpful. To use the system, each sale would be entered as it occurs. The sales order data would then be analyzed each day, and weekly data analyzed at the end of each week. This data would then be fed into forecasts for coming days and weeks.

Using Your Knowledge

2-1. Consider Jake's processes in the opening vignette of this chapter.

a. Create a BPMN for the Burger Assembly process.



b. Write a procedure for how the in-store employee inputs a customer order on the cash register system.

1) Enter entrée selection
2) Enter modifications (No ketchup, extra pickles, etc.)
3) Enter side selections (Fries, Onion Rings, No side, etc.)
4) Enter drink selection (Milk Shake, Soft Drink, Water, etc.)
5) Repeat for each member of customer's party
6) Complete order input to send to kitchen

c. What data is Jake using to make his information? Does the data have all the critical characteristics of good data as shown in Figure 2-13?
Jake is using the order data from the eight orders on the order screen. The data does have all of the characteristics of good data. First, the data is accurate, so long as the cashier entered the order correctly. Second, the data is timely. The screen shows placed orders that have not been filled. Third, the data is relevant in both context and subject. Jake needs data that relates to orders to be filled. Fourth, the data is just sufficient. Jake does not have to filter out order subtotals; he just needs to see if there are additional orders for the same menu item. Finally, the data is worth the cost. In this case, the data is already produced; Jake is simply mentally processing the data to create information that allows him to make his process more efficient. Doing so does not incur any additional cost on the part of the information system to do so.

2-2. Explain, in your own words, the relationship between business processes and information systems. Assume you are going to give your explanation to a business professional who knows little about information systems.
Information systems, at least business information systems, generally enable and/or facilitate the human actions required in a process. The steps in, and the data flow through, a business process are often embodied in an information system in a manner that minimizes human error, minimizes transaction time, maximizes efficiency, and standardizes the behavior of all actors in the process.

2-3. From your own life, choose three processes. These may be something like selecting a movie on Netflix, making breakfast, or registering for an account on a new social media platform. For each, specify:
a. if the process is dynamic or structured
b. process objectives
c. the steps in one of the procedures if the process is supported by an IS
d. several data items, and write down at least two interpretations for each data item.
Answers to this will vary greatly. If you intend to collect and correct student solutions to this question, the following formats are suggested.
For a & b:

PROCESS 1	
Circle one:	**Objectives:**
Structured Dynamic	
PROCESS 2	
Circle one:	**Objectives:**
Structured	

Dynamic	
PROCESS 3	
Circle one:	**Objectives:**
Structured	
Dynamic	

For c & d:

PROCESS NAME		
Process Steps:	**Data Items:**	**Data Interpretations:**

2-4. Consider some of the ramifications of the way in which information is defined in this chapter.

a. Why, according to this chapter, is it incorrect to say, "Consider the information in Figure 2-11?" Where is the information?

It is incorrect because Figure 2-11 is a table of data, not information. The information is in the mind of the reader who interprets the table from his/her own frame-of-reference.

b. When you read a news article on the Web, where is the news? When you and a friend read the same news, is it the same news? What is going on here?

The news occurs at a specific location. Words that describe the news that occurred are in the Web. Those words become news information when you read and interpret them. Yes, it is the same news. Whether you both interpret it as the

same information is dependent upon any number of factors. This exemplifies the difference between data (written news) and information (interpreted news).

c. Suppose you are having a glass of orange juice for breakfast. As you look at the juice, where is it?

The orange juice is in the glass.

Is the thing that you know as orange juice on the table, or is it in your mind?

The "thing" itself (orange juice), is in the glass on the table. If you know what orange juice is, tastes like, feels like, etc., that information is in your mind.

After you drink the orange juice, where is it?

After the orange juice has been drunk, it is in your digestive system; however, the memory of it, information about its color, taste, temperature, texture, etc. is in your mind.

d. Consider the statement, "Words are just tokens that we exchange to organize our behavior; we don't know anything, really, about what it is they refer to, but they help us organize our social behavior. Reality is a mutual hallucination. It only looks the way it does because all of us have the same, more or less, mental apparatus and we act as if it's there." Do you agree with this statement? Why or why not?

There are a limitless number of possible answers to this question. Whether or not the student agrees, one of the better approaches would be to address this from the systems perspective. There is more to interpreting reality than words. Our environment is the result of many stimuli perceived through a system of senses: sight, smell, hearing, touch, and taste. Words help us collectively share our perceptions, but don't necessarily affect them, although at a higher-order level of complexity, they may help us refine our perceptions. For example, an excellent description of the characteristics of a fine wine may help us better perceive the complexity of its "personality". Reality is perceived and often perceived incorrectly, but it is not a collective hallucination. At least for the vast majority, the reality perceived through our system of senses is in fact real. If one backs up and strikes the back of his/her head on an unseen, odor-free, unheard, untasted tree, the tree is not a hallucination, nor is the bruise and pain that results from the collision—although for different individuals, the pain perceived may differ, as might the description of the perception.

e. Describe how you might use insights from this sequences of questions to become a better business professional.

The preceding questions try to get the student thinking about our individual perceptions of reality and how our unique collection of knowledge, experiences and backgrounds may result in wide variations in individual perceptions of the same reality. If carefully considered and internalized, the recognition that one's own perceptions may differ from others' (and that one's own perceptions may in fact be further removed from actual reality than others') will cause a business professional to actively seek and consider others' perceptions when evaluating

alternative solutions to a business problem, when trying to understand their business/industry environment, etc.

2-5. Using Figure 2-8 as a guide, identify two structured processes and two dynamic processes at your university.

Here again, the number of answers is almost beyond limit. Here are a few examples.

Structured processes:
Registration
Fee Payment
Parking – where everyone has an assigned parking space
Dynamic processes:
Determination of electives for a student's major
The offensive strategy for the school's homecoming football game
Parking – where everyone has an assigned type of lot

Explain how the degree of structure varies in these processes.

Structured processes:

- Registration – highly structured, highly computerized. There are variations of what classes each student chooses, and when she/he takes them of course, but the process is highly repeatable and standardized.
- Fee Payment – same as Registration.
- Parking (assigned parking space) – fairly structured – people park in the same spot each day, although time of arrival and departure will obviously vary.

Dynamic processes:

- Determination of electives for a student's major – possibly some structure as determine by the student's major, faculty, and industry expectations. However, the actors in the process, except for the student him/herself, will vary wildly from decision to decision, and student to student.
- The offensive strategy of the school's homecoming football game – individual plays, even sequences of plays would be very structured. Overall strategy would be affected by the relative strengths and weaknesses of the opponent. Although the actual process is probably semi-structured, the dynamic nature of the event would yield potentially dynamic process alterations during the game.
- Parking (assigned lot) – semi-structured, there may be many lots of a given type, or only one of a given type. Access to spaces is first-come, first-serve, the process of filling a parking-lot, dynamic—almost organic.

How do you think change to these processes is managed?

Structured processes:

- Registration – changes would be carefully investigated, planned, developed and implemented followed by post-implementation review.
- Fee Payment – same as Registration.
- Parking (assigned parking space) – same as Registration.

Dynamic processes:

- Determination of electives for a student's major – possibly some structure as determine by the student's major, faculty, and industry expectations. However, the actors in the process, except for the student him/herself, will vary wildly from decision to decision, and student to student.
- Football team offensive strategy - changes to the process would be quick, reactive, temporary, and within the hierarchical structure of an athletic team. The amount of analysis, pre-planning, etc. would vary greatly within a game depending on outcomes.
- Parking (assigned lot) – less structured than "assigned space" parking. Changes would require less analysis due to the less granular level of detail required. Changes would be centrally managed at the lot level, individually managed at the space level.

Describe how the nature of the work performed in these processes varies.
Structured processes:

- Registration – most of the work (defined as activities performed by actors in the process) is computerized. The student is the primary human actor, supported by advisors, faculty, the Registrar, etc.
- Fee Payment – pretty much the same as registration, however there would be some different actors (VP of Finance rather than Registrar, for example).
- Parking (assigned parking space) – same as Fee Payment.

Dynamic processes:

- Determination of electives for a student's major – possibly some structure as determine by the student's major, faculty, and industry expectations. However, the actors in the process, except for the student him/herself, will vary wildly from decision to decision, and student to student.
- Football team offensive strategy – changes to the process would be quick, reactive, temporary, and within the hierarchical structure of an athletic team. The amount of analysis, pre-planning, etc. would vary greatly within a game depending on outcomes.
- Parking (assigned lot) – less structured than "assigned space" parking. Changes would require less analysis due to the less granular level of detail required. Changes would be centrally managed at the lot level, individually managed at the space level.

Explain how information systems are used to facilitate these processes.
Structured processes:

- Registration – as mentioned above, most of the work in this process is computerized. Human actors make decisions regarding course offerings and student selections, the information system tracks and controls.
- Fee Payment – human actors determine fees based on a categorized structure and course selections. The information system calculates fee totals and tracks and controls fee payment upon human actor payment activity.
- Parking (assigned parking space) – information system receives a request for a space from the human actor and the system assigns a space, or allows the human

actor to select a space based on certain criteria (kind of like selecting your own airplane seat).

Dynamic processes:

- Determination of electives for a student's major – information systems would play a more limited role in this process. The dynamic nature of this process requires more unstructured human interaction. Information systems would play a role in presenting a course listing, supplying information regarding courses already taken, prerequisites, course descriptions and major requirements.
- Football team offensive strategy – this information system is probably not computerized at all. Any computer-based information system support would likely occur prior to the event in the form of player and team-trend analysis.
- Parking (assigned lot) – computer-based information systems play a lesser role in this case than in the Parking (assigned parking space) process. The information system would simply track which type of lot each person is assigned to. There is likely very little interaction between the "parker" and the information system.

How do you think the character of the information systems supporting these processes varies?

Structured processes:

- Registration – highly structured, inflexible, standardized.
- Fee Payment – highly structured, inflexible, standardized.
- Parking (assigned parking space) – highly structured, inflexible, standardized.

Dynamic processes:

- Determination of electives for a student's major – the information systems to support this process would be in the form of information repositories that are used on-demand and probably differently by each student.
- Football team offensive strategy – this information system would be human-based, highly interactive, unstructured, non-standardized.
- Parking (assigned lot) – information systems supporting this, like more structured processes, would be standardized, structured, and inflexible. The human actors would play a less structured role.

2-6. Specify an e-commerce site where you have purchased something (e.g., Amazon, sports tickets, etc.).

For this example, Amazon is used. Students answers will vary based on the e-commerce site selected.

a. Write down your Buying process, including the activities you perform to buy the product.

1) Start Browser
2) Visit Amazon.com
3) Review items available
4) Select product for purchase
5) Read other customer reviews
6) Add item to shopping cart
7) Proceed to Checkout

8) Enter shipping address
9) Select shipping preference
10) Select payment method
11) Confirm order
12) Track shipment
13) Receive product
14) Use product
15) Provide feedback

b. Specify the five components of the IS that is supporting your e-commerce purchase. One piece of software is the Web browser.

Hardware – Your computer, smartphone, tablet, or Kindle, Amazon's Web servers and back-end databases
Software – Web browser, Amazon's customer interface and inventory database
Data – Customer reviews, product number, product quantity, shipping address, shipping preference, payment method, tracking number, your product review, product inventory data
Procedures – Start Web browser, evaluate customer reviews, purchase product, charge customer, retrieve product, pack order, ship
People – You, warehouse personnel, shipping personnel

c. How did you learn the necessary procedures?

The student may have learned the procedures through previous experience using the site, or through intuition. Amazon's sales process is relatively streamlined, providing customers with clear information requests and input validation to make sure all required information is captured as the process as a whole takes place.

Collaboration Exercise 2

Your task will be easier if you coordinate your work with SharePoint, Office 365, Google Docs with Google+, or equivalent collaboration tools. (See Chapter 9 for a discussion of collaboration tools and processes.) Your answers should reflect the thinking of the entire group, not just that of one or two individuals.
The purpose of this exercise is to compute the cost of class registration. To do so, we will consider both class registration processes as well as information systems that support them.

1. **Class registration processes:**
   a. **List as many processes involved in class registration as you can. Consider class registration from the standpoint of students, faculty, departments, and the university. Consider resources such as classrooms, classroom sizes, and requirements for special facilities such as audiovisual equipment, labs, and similar needs. Also consider the need for departments to ensure that classes are offered in such a manner that students can complete a major within a 4- or 5-year time period. For this exercise, ignore graduate schools.**
   Undoubtedly there are a couple of dozen processes involved in registration, but most students will probably identify one or two for each "standpoint." A typical list will look something like the following.
   STUDENTS:
   Advising process
   Course registration process
   FACULTY:
   Notification of department regarding course technology needs
   DEPARTMENTS:
   Course scheduling, including faculty and room assignments, and enrollment limits
   UNIVERSITY:
   Course list creation process
   Publication of course enrollments to departments and faculty
   Maintenance of course enrollments and waitlists

   b. **For each process, identify human actors. Estimate the number of hours each actor spends in the roles that he or she plays per enrollment period.**

Process	Human Actor(s)	Computer System(s)
Advising	Student, Advisor	Advising system
Course registration	Student	Registration System
Faculty technology request	Faculty Member, Dept. Chair	
Course scheduling	Dept. Chair	Registration System Room Scheduling System Personnel System
Course list creation	Registrar	Registration System
Publication of enrollments	Registrar	Registration System

Course enrollment and waitlist maintenance	Registrar	Registration System

As regards to hours spent by each actor, there is no correct answer; the idea is to get students thinking about the resources required to complete an institutional process like registration.

Interview, if possible, two or three actors in each role to determine the time they spend in that role per term.
If this is not possible, consider forming in-class groups of three or four students to collectively estimate role-based time per term.

c. Estimate the labor cost of the processes involved in class registration. Assume the fully burdened (wages plus benefits plus applicable taxes) hourly rate of clerical staff is $50 per hour and professorial staff is $80 per hour.
Once again, there is no correct answer; however, students should put their response in a well-organized, readable format. This would be a good place to require students to use a spreadsheet.

Determine the number of departments involved in registration and estimate the number of clerical and professional actors involved in each. Use averages, but realize that some departments are much larger than others.
Answers to this will be so varied that an example will not be instructive. However, at a minimum, students should identify the Registrar's office and academic departments, potentially the business office (or appropriate equivalent), advising office (if there is one), etc. The number of actors will vary greatly depending upon the size of your institution, and will vary greatly within that.

2. Information Systems

a. For each process identified in 1, list supporting information systems. Consider information systems that are used university-wide, those used by departments, and those used by individuals.

PROCESS	**Computer System(s)**
Advising	Advising System
Course registration	Registration System
Faculty technology request	
Course scheduling	Registration System Room Scheduling System Personnel System
Course list creation	Registration System
Publication of enrollments	Registration System
Course enrollment and waitlist maintenance	Registration System

b. For each information system identified in part a, describe the five components of that information system.

PROCESS	HARDWARE	SOFTWARE	DATA	PROCEDURES	PEOPLE
Advising	Thin client , Web server	Advising System Software	General Education requirements, Major requirements, Student records	Meeting scheduling, Advising	Advisor, Student
Course registration	Thin client, Web server	Registration system	Student records, Course file	Registration	Student
Faculty technology request	Thin client, Web server (or maybe a yellow pad of paper)	Room Scheduling system	Classroom file	Room reservation	Faculty, Dept Chair
Course scheduling	Thin client, Web server	Course mgmt software	Course file Classroom file		Dept Chair
Course list creation	Thin client, Web server, Printer(?)	Registration system, Email system(?)	Course file	Print course list	Registrar
Publication of enrollments	Thin client, Web server	Registration System	Course file Student files	Match courses to enrolled students	Registrar
Course enrollment and waitlist maintenance	Thin client, Web server	Registration System	Course file Student files Waitlist file	Match courses to students on the wait list.	Registrar

c. List sources of cost for each of the five components identified in part a. Consider both development and operational costs.

	COSTS	
COMPONENT	DEVELOPMENT	OPERATIONAL
Hardware	Servers, clients, data storage and backup, networking infrastructure purchase and installation	Electrical costs, domain registrations, IP number costs, etc.
Software	Software purchase/licensing and/or analysis, design and development, training	Support fees and/or maintenance costs, backup costs

Data	Initial data conversion and data entry	Backup costs, ongoing data entry
Procedures	Design, documentation, training	
People	Hiring and training	Ongoing training, wages and benefits

Ensure you have included the cost of training employees to execute the procedures.
Answers to this question will vary widely based on student assumptions. Students should show their work and answers should reflect the costs specified in 1c.

Explain how some of the personnel costs in your answer here may overlap with the costs of actors in processes.
A wide variety of answers are possible. Look for logical ties between the answer to part c and the students' knowledge of how registration operates at your university. For example:

- Disconnects between procedures design and the interface between people and software/hardware may increase personnel costs.
- Actors in the registration process probably participate in other processes such as fee payment, etc., so personnel costs will be shared among multiple processes.

Why will only some of those costs overlap?
Some of the components are truly dedicated to the registration process. For example, registration software likely has no direct role to play in other processes, so costs associated with registration software do not overlap with other processes.

Do all of the costs of class registration information systems apply to the cost of class registration business processes? Why or why not?
No, registration information systems are part of a larger "university information system." The university information system will share data among many systems. That data will likely be stored in a relational database in which many of the files are used by many different systems.

d. As a student, you have no reasonable way to estimate particular information systems costs in your answer to part c. However, using your best judgment, estimate the range of total costs. Would it be closer to $10,000? $100,000? $1,000,000? More? Justify your answer.
There is no way to supply an answer that will satisfy at every institution. What is important is that the student justifies his/her answer using data. How many human and computer actors? What does each cost on average? Has the student included infrastructure costs? Maintenance costs, etc.?

3. **Effectiveness and efficiency:**
   a. **What does the term *effectiveness* mean when applied to business processes?**
   The process contributes to the achievement of organizational objectives.

   List as many pertinent effectiveness objectives for class registration as possible. List possible measures for each objective.

Objectives	Measures
The system correctly assigns students to selected classes.	Exception reports of advising errors, student registration mistakes, etc.
The system results in students feeling the process was un-intrusive, even rewarding.	Student attitudes toward registration as measured indirectly through complaints/comments and directly through post registration surveys, etc.
The system recognizes time and prerequisite conflicts and assists students when these occur.	System tracks through log files the number of time and prerequisite conflicts identified and corrected during registration

   b. **What does the term *efficiency* mean when applied to business processes?**
   Process completion requires a minimum amount of resources.

   List as many pertinent efficiency objectives for class registration as possible. List possible measures for each objective.

Objectives	Measures
Registration can be completed in a prescribed total time.	Binary measurement, completed on time or not. Activity time – total time during the registration period that nobody was actively using the registration system subtracted from the total time registration is open.
Average registration time/student is at or below a set benchmark.	Calculate from log files the average time it took students to complete the registration process. Also could determine minimum and maximum times, as well as calculate median time.

4. **The quarter system. Many universities operate on a four-term quarter system that requires class registration four times per year as opposed to semester systems that require class registration just three times per year. Recently, the state of Washington has experienced large tax revenue reductions and has severely cut the budget of state universities, resulting in substantial increases in student tuition and fees. Yet the University of Washington continues to operate on a quarter system.**

a. Assume you work for a university using a quarter system. Justify that system.

The quarter system, in which there are three academic periods during the course of the academic year, has a number of possible advantages over the semester system:

- Some would suggest the larger number of classes that can be offered with the same number of faculty under the quarter system allows for creative curriculum design.
- It is believed by many that the current generation of college students has a shorter attention span than generations in the past. The quarter system, given its shorter timeframe, allows students to better maintain focus and learning intensity over the duration of the quarter.
- In the quarter system, courses meet more often, generally 4 hours per week rather than 3 hours per week (semester system). This keeps students focused on the subject and may immerse them in learning more effectively.
- Courses can be offered more often in the quarter system, which allows students to better manage their academic performance. The cost of dropping a course, for example, is less when it can be retaken without waiting an entire year.

Can your argument be based upon Registration process efficiency? Why or why not?

Probably not, although registration efficiency cannot be used to justify the semester system either. One could possibly argue that efficiency, defined as total resources dedicated to registration over an academic year, will be less under the semester system, but it is a questionable argument given the degree of automation in the registration process, particularly for school personnel.

Can it be based on Registration process effectiveness? Why or why not?

The automation of registration via computer-based information systems should not allow an argument against the quarter system based on any measure of effectiveness affected by the registration process.

b. Assume you attend a university on a quarter system. Using your answers in questions 1 and 2, write a two-page memo explaining the advantages of converting to a semester system.

Given the answers above, converting to a semester system cannot be justified, therefore a two-page memo is not appropriate if a student answered as above. If the student did feel efficiency and/or effectiveness can justify a move to the semester system, his/her response must be well written, logical and defendable from an efficiency and/or effectiveness perspective.

c. Considering your answers to questions 1 and 2, do you think it would be wise for universities to convert to semester systems? Why or why not?

There isn't a correct answer to this. What is important is that the students' answers are consistent with their responses to parts a and b, and that their position

is well presented.

Would you recommend a national policy for universities to use the semester system?
Here again, no correct answer, but a solidly defended position that considers the system-wide effects of such a policy is the desired outcome.

d. If converting from a quarter system to a semester system is advantageous, why not convert to a one-term system? What would be the advantages and disadvantages of such a system? Would you recommend one if it reduced your tuition by 25 percent? 50 percent? 75 percent?
No correct answer. Student responses will, of course, cover the entire spectrum, but hopefully will address the question from a systems perspective.

e. At present, there is no public outcry to convert the University of Washington to a semester system. There has been, however, considerable public anguish about the increasing costs of tuition. Why do you suppose this situation exists?
This question assumes a correlation between the quarter system and rising tuition. Such a correlation is defendable. Student responses should address this, and could suggest that the invalidity of this assumed correlation may come from the sense that an additional registration period every year adds to tuition cost.

f. Given your all of your answers to this question, which type of term system (e.g., quarter, semester, year) does your team believe is best? Justify your answer.
Once again, no correct answer, but any position taken must be well defended and consistent with prior responses.

Case Study 2

An Amazon of Innovation

2-7. In what ways does Amazon, as a company, evidence the willingness and ability to collaborate?

Amazon's affiliate program is one of the premier examples of collaboration in the business environment. Literally thousands of businesses sell products through Amazon's ecommerce system and their products are shown to consumers in the same search results as Amazon's own products regardless of price competitiveness.

2-8. In what ways does Amazon, as a company, evidence the willingness and ability to experiment? Use Amazon Coins as an example.

Amazon's history is one of experimentation, followed by analysis of results and informed adaptation. Amazon's patent for the "one-click buy" process is an example of a willingness to experiment and try something different. They also pioneered the process of allowing customers to post product reviews, both good and bad, on their Web site, as well as site personalization base on customer purchase history and the promotion of products similar and/or "also purchased" associated with the current product being viewed.

2-9. In what ways do you think the employees at Amazon must be able to perform systems and abstract thinking?

Amazon's entire "storefront" is an abstraction. Customers don't see actual products, they see descriptions (abstractions), pictures (abstractions), customer reviews (abstractions), comparable products (actually abstractions), etc. Amazon employees must understand how to abstract products through descriptions, pictures, etc. such that the abstractions work within the systems Amazon uses to support its business processes.

2-10. Describe, at a high level, the principal roles played by each of the five components of an information system that supports order fulfillment.

COMPONENT	PRINCIPLE ROLE(S)
Hardware	Serve Amazon's Web site, order fulfillment, and tracking system.
Software	Present Amazon inventory, pricing, and product information to customers through a Web site. Allow product orders and payment through a Web site. Facilitate order fulfillment and shipping through the order fulfillment system.
Data	Is the abstraction of products that customers see when they use the Amazon Web site. Abstracts the products ordered by customers for order fulfillment.
Procedures	Supported by hardware and software across the board, procedures standardize the process of communicating with customers before and after the sale, the process of maintaining product offerings, listing affiliates' products, payment collection, order fulfillment, customer feedback and product reviews, and post-sale customer

	service.
People	People at Amazon maintain product inventories using information systems. They fulfill orders. Handle customer service for returns and order fulfillment problems.

2-11. Choose any five of the innovations in Figure 2-15 and explain how you think Moore's Law facilitated those innovations.

The Amazon Kindle in 2007 is basically a small focused-functionality computer that has network connectivity and the ability to download print material for electronic viewing. The incredible power of the microprocessor and its precipitous price drop allowed for the Kindle's creation and affordability.

2-12. Suppose you work for Amazon or a company that takes innovation as seriously as Amazon does. What do you suppose is the likely reaction to an employee who says to his or her boss, "But I don't know how to do that!"?

The boss could be credited with any number of responses, all of them negative. Responses could range from "You are fired" to "I don't care if you don't know how to do that, figure it out!" There is the possibility that the boss could assign a mentor, send the employee to training, etc. It truly depends on the individual.

2-13. Using your own words and your own experience, what skills and abilities do you think you need to have to thrive at an organization like Amazon?

Student responses will include many different skills. A list of examples:

- Process design and documentation
- Brainstorming and constructive communication
- Abstract thinking
- Systems thinking
- Organization skills