Part 1. Using appropriate diagramming software, create DFD context and level-0 diagrams for the City of Miami, Florida Bike-Share program. (8 points):

- [http://www.decobike.com/miamibeach](http://www.decobike.com/miamibeach)
- the system is required to support hourly rental, or memberships
- the system can show the user a map of bike-share locations
- the system can tell the user how many bikes are available at any location
- an audible sound is produced when a user returns a bike to a bike-share docking station

Decobike Bike Rental DFD Context Diagram
Decobike Level-0 Diagram

1.0 Create Membership Record
2.0 Compute # of Bikes per Location w/ Map
3.0 Process Payment
4.0 Confirm Membership
5.0 Allow Bike to be Released
6.0 Update Bike/Location
7.0 Confirm Bike Return

User

User Information
# of Bikes per Location with Map Info
Credit Card Information
Rented Bike
Auditory Signal (Ding)

New Membership Record
Bike/Map Info
User Membership Info
Payment Confirmation
Membership Confirmation

Member Records
Bike Inventory with Location Map
Updated Bike/Location Info
Updated Info
Returned Bike

Part 2. Referring to Hardware_Software_Primer, Closing Case_2, page B3.19, answer Questions 1, 2 and 3. (1 point each)

Questions
1. Identify the six hardware categories and place each product listed in the case in its appropriate category.
2. Describe the CPU and identify which products would use a CPU.
3. Describe the relationship between memory sticks and laptops. How can a user employ one to help protect information loss from the other?

Question 1:
The six hardware categories are:

- Central Processing Unit (CPU)
- Primary Storage
- Secondary Storage
- Input Devices
- Output Devices
- Communication Devices

The devices listed in this Closing Case and the categories they belong in are:

- Laptop: CPU, primary storage, secondary storage, input devices, output devices, communication device
- Smart Phone: CPU, primary storage, input devices, output devices, communication device
- MP3 Player: CPU, primary storage, input devices, output devices
- Memory Stick: primary storage
- Memory Card: primary storage

Question 2:
The CPU is the Central Processing Unit. It is the portion of hardware that reads the instructions to execute software. It also coordinates the interaction of the other hardware devices. Any device that can run software programs would have some sort of processor in order to execute those programs. In this Closing Case, the items listed that would contain a CPU are the laptop, smart phone, and MP3 player. However, the memory stick and memory card would also be reliant on the CPU of the devices they are plugged into in order to retrieve the data stored on these devices and display it on the device that contains the CPU. Therefore, all devices listed in the Closing Case would use a CPU in some fashion.

Question 3:
Memory sticks are portable storage devices. They can be plugged into the USB port of a laptop and either used to save information from the hard drive of the laptop or transmit information from one laptop to another. Memory sticks can be used as additional storage for the data saved within the hard drive of a laptop. If they are used in this case, they act as a form of secondary storage (long-term storage solution to the data on the laptop). If a memory stick was used to store a copy of all the data on the laptop’s hard drive and the laptop was damaged beyond repair, the information would still be accessible to the user through the memory stick. The memory stick would have to be plugged into another device to be able to view it, but the data would still exist. Conversely, if the memory stick was damaged beyond repair to extract the data from it, the data would still remain on the laptop’s hard drive if the user saved the information there as well and the laptop was undamaged.
Part 3. Referring to Enterprise_Architecture reading assignment, Closing Case_1, page B4.15, answer Questions 1,3,4,5. (1 point each)

Questions
1. Review the five characteristics of infrastructure architecture and rank them in order of their potential impact on the Tribune Co.’s business.
2. Define backups and recovery. What are the risks to the Tribune Co.’s business if it fails to implement an adequate backup plan?
3. Why is a scalable and highly available enterprise architecture critical to current operations and future growth?
4. Identify the need for information security at the Tribune Co.

Question 1:

The five characteristics of infrastructure architecture are flexibility, scalability, reliability, availability, and performance. All five of these characteristics have a critical impact on Tribune Co.’s business. Not meeting any of these five characteristics would have significant impact on costs to the company, so ranking them in order of largest to smallest impact is quite challenging. However, one way to rank these characteristics on their impact could be:

1.) Reliability – if the data in their system is incorrect, the company could end up sending newspapers to the wrong individuals, miss sending papers to the correct customers, or end up missing pages from the papers they do send out (as had already occurred during the transfer to the new architecture). This could potentially lead customers to discontinue their subscription.

2.) Performance – if the systems the company uses are not quick, workers may spend time waiting on systems to work when they could be working. Additionally, if a lack of adequate performance also impacts the company’s website (causing the website to be slow to load), it may deter customers from signing up for a subscription with this company. This would cost the company more funds in both employee costs (more down-time for employees) and fewer customer revenues (fewer customers willing to wait for the webpage to load to sign up for services).

3.) Availability – if the system is down for several upgrades, maintenance, and repairs with a high frequency, it can cost both employee time and customer use. Similarly to performance, if employees are unable to access vital systems to complete their jobs, there is added down-time where employees are paid but not working as efficiently as possible. Additionally, if the company’s webpage is not regularly accessible, customers will be deterred from paying for subscription services.

4.) Scalability – if the company’s systems are unable to grow with increased membership, it could prevent customer growth. If systems slow down because there are more customers accessing them, then customers will be deterred from accessing the webpage and subscribing to the company’s services.

5.) Flexibility – the company’s systems also need to be flexible to meet business process changes. Based on the article, it sounds as though the company has already begun working on changing software for the classified-ads to meet new business processes, so hopefully the company is already considering ways to make this new software more flexible to additional business practice changes as time goes on. Otherwise, the company will have to continue to pay developers to create new software for each change in business practices – taking up developer resource time and increasing costs to the company.
Question 3:
Backup is an exact copy of a system’s information. Recovery is the ability of a system to be restored and operational after a system crash or failure. The process of recovery uses the backup information to restore the system. If Tribune Co.’s business does not implement an adequate backup plan, they run the risk of losing all the information they have gathered. Even if some of the information they lose in the event of a system failure can be recovered, they may lose time and money attempting to recover their systems after the failure than they would have had they implemented a backup plan prior to the disaster.

Question 4:
Scalability is important to current operations and growth as it relates to a system’s ability to adapt to increased demands. While the system may be able to handle current operations, if the business continues to be successful, it may grow and put additional stresses and needs on the current system. If the system is scalable, it should be able to handle this increased growth. Availability refers to being continuously operational. While systems do need upgrades and maintenance from time to time and these require outages, having a highly available system allows users to access it on their own time when they want to. Current operations would likely decrease if users were unable to access the system regularly.

Question 5:
Information security is needed for most organizations’ systems. For Tribune Co., the need for information security is especially great since their system contains client information. If the information in the system is not secure, other competing companies could attempt to access this information and take current customers away from Tribune Co. Also, for classified ads, individuals posting ads may not want all of their information to be published and publicly available. If information security is not a priority for Tribune Co., they may lose a substantial portion of their customer base.

Part 4:
1. **Write a brief pro/con assessment of public sector adoption of cloud computing services. (5 points).**

The potential benefits to the public sector in adopting cloud computing services are: low initial investment requirements, increased scalability, and cost saving. The low initial investment requirements refer to a department’s ability to test cloud services before moving to full-scale implementation. Increased scalability is a result of software in cloud computing devices receiving rapid upgrades and releases. The cost saving benefit is a result of the reduced costs to the business for downloading and paying for software programs for each employee’s computer. Additionally, it reduces costs by reducing the amount of time spent downloading and upgrading the software on individual employee’s computers.

The potential disadvantages to the public sector adopting cloud computing services are: privacy, security, and reliability. If company documents are being held by a third-party service, they may have access to those documents. Additionally, there may be concerns with respect to the security of the information in cloud computing services. Will someone besides the third-party be able to access the data? Additionally, if the cloud computing services go down, the department is dependent on a third party fixing the issue – losing a certain amount of control over the maintenance of the system as well as the information stored there.
2. **Provide a technical description of IUanyWare as an implementation of virtualization. (3 points)**

IUanyWare is a virtualization service that offers employees and students of Indiana University the ability to run software applications on their own computing devices without having to download and install the applications to their home computers. It allows users to virtually run and interact with software that is actually being run on remote servers. This allows users to have access to applications that are often costly to purchase and that may also require frequent upgrades. IU can handle the upgrades and the users have access to the most up-to-date versions of these software applications.

3. **What circumstances would be required for machine intelligence to be employed as part of public administration? For example, an information system that issues administrative orders in the field of environmental law, or a system that is responsible for sanctions in relation to speeding or financial fraud. (2 points)**

In order for computers to be able to apply machine intelligence to public administration, the computers would have to be programmed with the requisite knowledge and rules associated with the field. For the example provided in the question regarding environmental law, all related statutes and rules pertaining to environmental policy would need to be in the system, as well as the logic for addressing these problems (the order in which the system should access the information to lead to the correct answer). Additionally, there would have to be an ability for the computer to learn from prior examples (precedent) to ascertain the appropriate outcome. There would also need to be regular updates to the system as additional cases occur and statutes/logic for solving these problems change.