Part_1. Using appropriate diagramming software, create DFD context and level-0 diagrams for the Red Cross blood donor app, providing the 4 listed functions. (8 points):

Part_2. Referring to Hardware_Basics powerpoint (and/or related websites), develop a Flow_Chart describing the Turing Machine processing cycle. Note that a Flow_Chart describing the machine instruction cycle for a VonNeumann machine is included in the powerpoint.
Part 3. Referring to Enterprise Architecture reading assignment, Closing Case_1, page B4.15, answer Questions 1,3,4,5. (1 point each)

1. Review the five characteristics of infrastructure architecture and rank them in order of their potential impact on the Tribune Co.’s business.

   The five characteristics of infrastructure architecture are flexibility, scalability, reliability, availability, and performance. Flexibility refers to a system’s ability to adapt and change with the needs of the organization and its users. Scalability refers to a system’s ability to grow in size and scale along with the needs of the organization and its users. Reliability describes a system’s dependability and its ability to function through corrupt inputs. Availability measures the access organizational members have to the infrastructure. Finally, performance describes the speed at which a system performs the ordered tasks.

   I will evaluate and rank the five characteristics based on the needs of the Tribune in moving to their new system. The case indicates load times were an important issue in the earlier system, but performance has dramatically improved since the migration. The Tribune’s numerous subsidiaries and ad buyers had trouble accessing the servers for a brief period during the migration, which resulted in a significant revenue loss. Therefore, reliability is a top priority for the Tribune. It seems like the company has a number of subsidiaries, and will likely acquire more and different businesses. Therefore, Flexibility and scalability are high priorities for the Tribune. My priority rankings for the Tribune’s infrastructure architecture are as follows:

   1. Reliability
   2. Flexibility
   3. Scalability
   4. Availability
   5. Performance

3. Define backups and recovery. What are the risks to Tribune Co.’s business if it fails to implement an adequate backup plan?

   Backups and recovery refer to the systems in place for safeguarding and retrieving data in the event of a system malfunction or failure. Well-designed systems minimize the financial loss and resource damage in the event of a malfunction or failure. Backups are exact copies of data within a system, while recovery refers to a system’s capability of replicating the pre-failure or pre-malfunction state of the system, including complete copies of data.

   There are massive risks to the Tribune if the backup and recovery systems fail, as with any business or individual. According to the case, they already experienced $1 million in lost revenue due to a system error caused by their migration. Continued unreliability will have more serious direct and indirect financial impacts on their operations (direct meaning lost ad revenue, and indirect meaning lost subscription and ad sales in the future due to damaged brand perception).
4. Why is a scalable and highly available enterprise architecture critical to current operations and future growth?

Scalability is a crucial aspect of future growth. A well-thought-out initial system intentionally designed for future growth minimizes future investment and productivity drags. In the context of the Tribune example, a well-designed system ready for scale would include a standardized ad-buy system that can be easily incorporated into the business processes of future business acquisitions. Similarly, a highly available system enables organizational stakeholders the access they need to conduct their business, while a less available system makes it difficult for stakeholders to engage with the enterprise. A lean system makes it easy to grow, while an un-scalable, un-available system puts a significant burden on growth and operations.

5. Identify the need for information security at the Tribune Co.

Information security refers to the protection of sensitive and personal information contained within a system, and the ease or difficulty for an external party to gain access to this information. The Tribune processes a number of ad buys from organizations and individuals, so they have a significant interest in protecting customers’ payment information. Journalists often report on highly-sensitive subjects and may uncover or obtain private information in the reporting process. If the Tribune’s email servers were to experience a hack, sensitive and potentially dangerous information could become accessible to external parties. Developing a state-of-the-art information security system will also help the Tribune market themselves to potential ad customers, and establish trust with sources contributing to the reporting activities of the paper.
Part 4:
1. Write a brief pro/con assessment of public sector adoption of cloud computing services. (5 points).

There are several advantages of adopting cloud computing services within the public sector context. One of the main advantages is the reduction in cost to the public, which potentially translates into lower taxes or more available funding for other federal initiatives. Cloud services are generally more reliable, and are considered the cutting edge of data storage technology. Storing more data on the cloud requires less physical storage on devices, and encourages public sector organizations to transition to more wireless-enabled devices. Hosting software on the cloud (similar to IU Anyware) can also greatly reduce annual software licensing expenditure. Cloud computing can also have a positive impact on system performance, including software load times.

However, there are some important disadvantages of implementing cloud computing within the public sector. Chief among these is information security. While information can still be encrypted and hypothetically, access can be limited only to employees, information that travels through the internet is inherently more vulnerable than information stored within an intranet system. Because cloud technology is new and still developing, information security hasn’t developed at the same pace as the technology itself, giving rise to increased vulnerabilities. Additionally, any system upgrade will come with a price tag, and switching to cloud computing will require expensive hardware and software upgrades. It may be some time before a public sector organization breaks even on a cloud computing service investment.

2. Provide a technical description of IUanyWare as an implementation of virtualization. (3 points)

IUanyWare is an example of a virtualization system: software licenses for intensive, expensive programs like statistical analysis and design software are available for use to any member of the IU IT network. This greatly reduces the number of total licenses needed by the university, eliminates the need for users to access programs from the university local network or computers, and allows dynamic licensing (ie. ability to quickly respond to changes in software demand and usage). For example, I frequently use SAS, a statistical analysis software program, for my SPEA coursework. I access this software one of two ways: a) by logging in to the IUanyWare portal and running the SAS program through a Citrix client or b) running a virtual desktop via Citrix, further increasing the performance and reliability of the virtual software.

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)

Abstractly, machine intelligence would provide a significant benefit to Federal government operations, including reduced error, lower costs, and the ability to develop more intelligent decision mechanisms based on past experiences. However, smart machines would only provide benefit in a small number of applications within the US policy system due to the high degree of nuance around many
Federal information processes. For example, in theory, a smart machine would be able to process, evaluate, and issue approval or denial in environmental discharge applications because the rules for these permits are clearly outlined in the Federal code. However, in practice, there are a number of limitations to smart machine implementation in the permit-issuing process. There are a number of situations where the Federal government grants exceptions, reaches compromises, or custom-tailors permit specifications based on a number of other factors, such as economic costs, public health concerns, etc. The objectives and political realities of the EPA are not simple enough to be distilled into a standardized, automated permit process.

The inability to process nuance and make exceptions can also be perceived as a benefit of smart machines. Transferring responsibilities to an intelligent machine would greatly reduce the opportunity for corruption, error, and delay in federal operations.

In order to successfully employ smart machines within the federal regulatory process, lawmakers would need to structure rules and regulations to suit the constraints of machine intelligence. There would likely be little room for nuance or exceptions. Additionally, massive amounts of data and information on past permits, laws, and entities would need to be coded and included in the permit-issuing algorithm, which would present a significant and costly challenge.