

Revision Questions for Section 1.2 - System Design Basics

with thanks to Mr Dave Mulkey, FIS

Components of a computer system

1.2.1 Defining terms

- a. State one example of a **peripheral** that might be attached to a **personal computer** (PC), but not always.
- b. Outline 2 significant purposes of a network.
- c. Describe one advantage of using a PC in **stand-alone** mode, not attached to a network.
- d. Outline what the term **human resources** means in a computer system.
- e. Explain why computer systems require both **hardware** and **software**.

1.2.2 Roles of computers in networks

*Assume that a student is searching for news articles about automobile manufacturing in China.
The student is using a wireless connection at a school.*

- a. Describe what the term **client** refers to in this situation.
- b. Explain the purpose of a DNS server during this scenario.
- c. Outline 2 different places that contain **routers** that are being used by the student.
- d. Explain how a **firewall** might provide a use service in this situation.
- e. Describe the role of a **web-server** in this situation.

1.2.3 Social and ethical issues of networks

- a. Describe a situation when **new software developments** would be a **disadvantage** for an Internet user.
- b. Explain the **ethical responsibilities** of the software industry regarding benefitting and disadvantaging Internet users.

System design and analysis

1.2.4-5 Stakeholders in new computer systems

Imagine that a new automated online ticketing system is being developed for people who wish to reserve and purchase airline tickets.

- a. Outline 3 different groups of **stakeholders** for this system.
- b. Describe 2 ways that **needs and wishes** can be collected before this system is designed.
- c. Describe 2 **hardware issues** that must be considered when designing this system.
- d. Describe how **end-users** can be involved in testing and debugging the software for this system.

1.2.6-7 Techniques for gathering information / Representing system requirements

Assume that a school wishes to install a set of networked printers, enabling teachers and students to print documents in color and/or black and white. The school already has a LAN, and wishes to add 10-20 new printers.

- a. Describe how **current systems** could be studied during the **analysis** phase.
- b. Describe how **literature searches** might be helpful during the **analysis** and **design** phases.
- c. Outline some **organizational capabilities** that should be considered during the **design phase**.
- d. Assume that the school wishes to allow printing from **teachers'** PCs that are attached to the

school's LAN, as well as printing from laptops that are using the schools WIFI network. Draw a **data-flow-diagram** showing how the most important components interact with each other.

1.2.8-1.2.10 Prototypes / Iteration / End-user involvement

- a. Outline 2 advantages of constructing a **prototype** before writing a computer program.
- b. Explain why software development is usually an **iterative** process.
- c. Explain two possible undesirable consequences of not involving the **end-user** in the design process.

1.2.11 Social / ethical issues of new computer systems

Assume that a school will purchase a new computer system that is used to help students apply to universities. It helps the counselors keep track of which students have completed various stages in the application process. It also includes communication software that can transmit information like transcripts and teacher recommendations from the school to a university.

- a. Explain two reasons why **security** is a significant issue in this system.
- b. Outline two **ethical issues** connected to user training and/or lack of user training.
- c. Outline two **usability issues** that the school should consider before choosing a new system.

Human interaction with the system

1.2.12-15 Usability / Accessibility

- a. Define the term **usability**.
- b. Explain the importance of **learnability** as it relates to **usability**.
- c. Outline two common **usability** issues connected to **cell-phones** - do NOT include issues connected to any specific disabilities like old age or lack of hands. You must discuss usability problems that "normal" people experience.
- d. Explain two significant differences between **electronic digital devices** and other electrical devices that are NOT digital. Examples would help significantly here.
- e. Outline two **accessibility features** that would be appropriate to improve the usability of a personal computer for a user who has only one hand.
- f. Outline two **usability problems** that have prevented **voice recognition systems** from becoming more widespread in the computer industry.

1.2.16 Implications of human-machine interaction

*Google is trying to market a **self-driving car**. This would be particularly useful for blind people who wish to have their own car and enjoy the freedom and mobility that it provides.*

- a. Outline 3 sets of **stakeholders** for the Google Car System.
- b. Describe 2 **ethical issues** associated with this system.
- c. Describe 2 **economic issues** associated with the Google Car System.