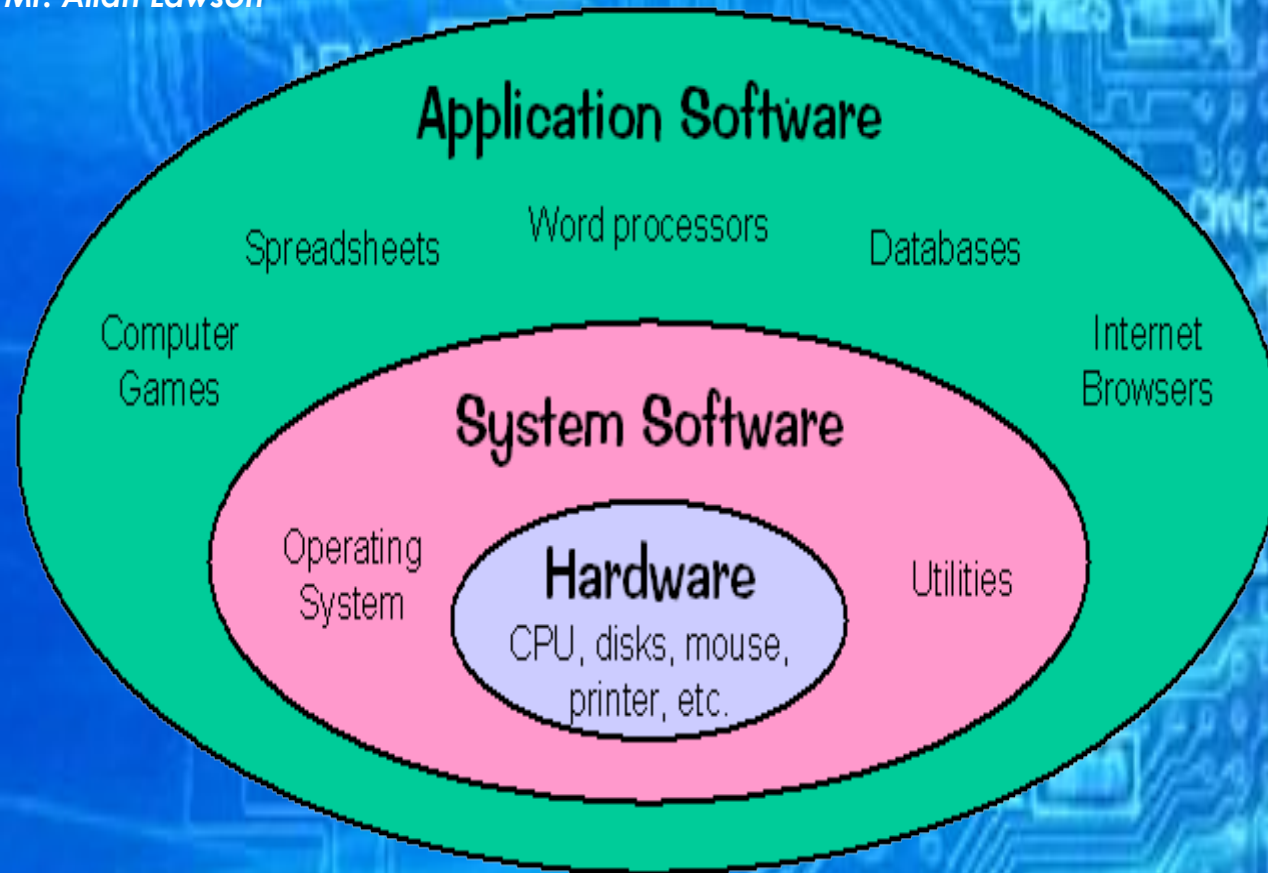


SYSTEM FUNDAMENTALS

IB - GROUP 4 - COMPUTER SCIENCE

By: Mr. Allan Lawson



1.1 (PLANNING & SYSTEM INSTALLATION) SYSTEMS IN ORGANISATIONS

A computing system is a dynamic entity, used to solve problems and interact with its environment. Note how the term is used separately from the word computer. A computer is a device. As such, a computing system is composed of hardware, software, and the data that they manage. Computer hardware is a collection of physical elements that make up a machine and its related pieces; the casing, circuit boards, electronic chips, wires, disks, keyboards, monitors, the list goes on. Computer Software is the collection of programs that provide the instructions that a computer can carry out. At the very heart of a computer system is the information that manages.

1.1.1 IDENTIFY THE CONTEXT FOR WHICH A NEW SYSTEM IS PLANNED

Topic 1.1.1

Identify the context for which a new system is planned

Designing a new system

Before a system is designed, what the new system should do needs to be identified.

Systems analyst

Systems are designed and analysed by systems analyst. She / He looks at the existing system and tries to document how it works through observation.

This can be done using surveys, interviewing users, observing them or tracing how information is handled by looking at the documents produced by it.



EVALUATION & FACTORS

E: Then the systems analyst must take an evaluation of the current system.

What works fine, what doesn't?

Based on this, he proposes a new system to be created that should work better than the old one, increasing productivity.

F: For this, the systems analyst has to factor in a number of things:

What existing infrastructure from the existing system can be used?

What requirements on hardware and software will the new system have?

Are there any ethical issues resulting, for example will the new system make people redundant, leading to loss of jobs? Will people need retraining?



1.1.2 DESCRIBE THE NEED FOR CHANGE MANAGEMENT

Change is hard

Without a proper plan on how the new system will be implemented once it is designed the change from the old system to the new one will not be successful. Many factors will need to be regarded:

- Employer/employee training
- How will the system be implemented?
- Type of change-over: direct changeover? Parallel running? Pilot projects? Phases implementation?



WHY DOES CHANGE NEED TO BE MANAGED?

- Change management is a structured approach for ensuring that changes are thoroughly and smoothly implemented, and that the lasting benefits of change are achieved.
- The focus is on the wider impacts of change, particularly on people and how they, as individuals and teams, move from the current situation to the new one.
- The change in question could range from a simple process change, to major changes in policy or strategy needed if the organization is to achieve its potential.



1.1.3 OUTLINE COMPATIBILITY ISSUES RESULTING FROM SITUATIONS INCLUDING LEGACY SYSTEMS OR BUSINESS MERGERS

Key Concepts

- Legacy System – In computing, a legacy system is an old method, technology, computer system, or application program, that may or may not be supported/available for purchase any more.
- Merger – A combination of two things, especially companies, into one.

Mergers are complicated!

- Rarely any two businesses on the world use the exact same systems. So, when two businesses merge, it is a major issue to get their systems to work together. Some issues are listed below:
 - I. Language differences
 - II. Part of business operating in a different country that host using an older version of a system
 - III. If workers delegate, will their laptops work in other departments?
 - IV. If an American and an European business merge, their unit system need to be merged (one uses SI units, one doesn't)
 - V. Businesses not using same software environment



Topic 1.1.4 – Compare the implementation of systems using a client’s hardware with hosting systems remotely.



Software-as-a-service (SaaS):

Remotely hosted computer system

Servers lend from software manufacturer

Managed and maintained by software manufacturer

Application Service Provider (ASP)

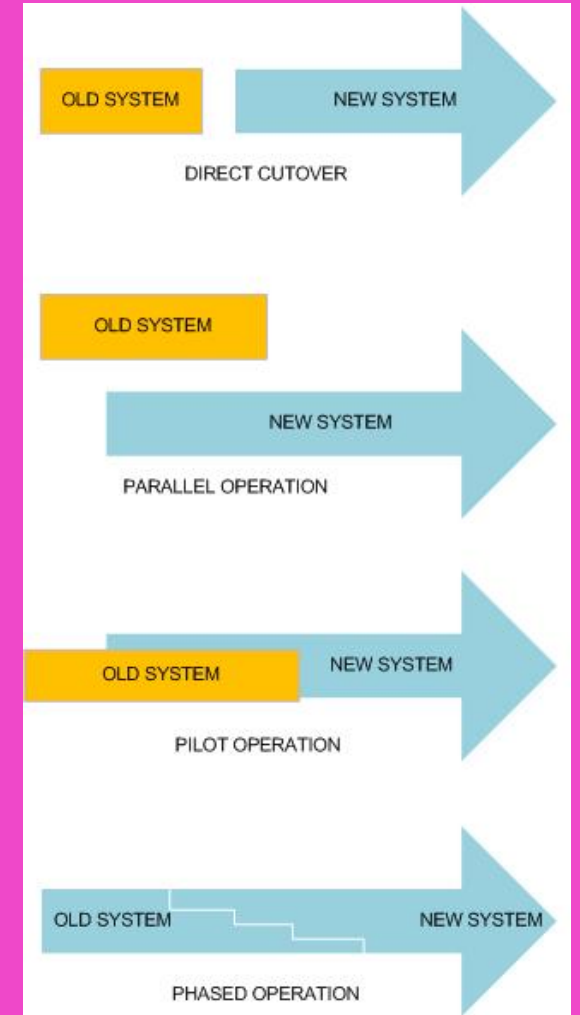
	Local system (in-house)		Cloud system (outsourced)	
Advantages	Full control over software, features, backups & data Low ongoing cost Security		No technical skills required Low initial cost, legacy software, feature control, backups can be controlled	Convenience Security, backups, collaboration, environmentally friendly
Disadvantages	High initial cost for hardware and software Technical skills required		High ongoing cost Loss of full control Possible security risk Slow speeds, lack of collaboration	Security, Service outage, Storage limits, slow speeds, limited featured

Topic 1.1.5 – Evaluate **alternative** installation process

4 types of installations:

- Direct
- Parallel
- Pilot
- Phased

Installation Options:	DIRECT: The old system is stopped and the new system is started	PARALLEL: The new system is started but the old system is kept running alongside. Data is input into both systems.	PILOT: The new system is piloted (trially) in a small part of the business. Once it is running correctly then the new system is implemented across the organization.	PHASED: The new system is introduced in phases as parts of the old system are gradually replaced with the new system
Advantages	Minimal time and effort, new system is available immediately	If new system fails the old system runs as a backup, The outputs from the two systems can be compared to see if the new one is running correctly	All features can be fully trialled, If the new system fails only a small part of the organization suffers, staff who were part of the pilot study can train other staff	Allows people to get used to the new system, training can be done in stages
Disadvantages	If the new system fails there is no backup	Running two systems is costly in terms of time and money	For the section that is piloting if the system fails there is no backup	If the new part of the system fails there is no backup for that area



Topic 1.1.6 – Discuss **problems** that may arise as a part of **data migration**

Possible Problems Include:

- *Incompatible file formats*
- *Data structure differences*
- *Validation rules*
- *Incomplete data transfers*
- *International conventions on dates, currencies & character sets*

Topic 1.1.7 – Suggest various **types of testing**

Testing includes:

- Testing is very important in developing a computerized system, as it tries to ensure that the system works as expected.
- A system that does not work as expected (is it buggy) greatly reduces productivity and end user satisfaction.
- Testing is usually done in two stages: before the system is delivered and after it has been set up.
- Testing in the first stage is often referred to as **Alpha testing**, while testing in the second stage is often referred to as **Beta testing**.

ALPHA -VS -BETA

Alpha testing involves the engineers who develop the system testing it with data similar to real data

Beta testing involves testing by real users with real data

Different types of testing can be:

- Alpha testing
- Beta testing
- White box testing (tracing data on paper as it proceeds through algorithm)
- Black box testing (putting in data and comparing with expected outcome)
- Debugging (using an automatic program, a debugger)

Topic 1.1.8 – (User Focus) Describe the importance of **user documentation**

How important is documentation?

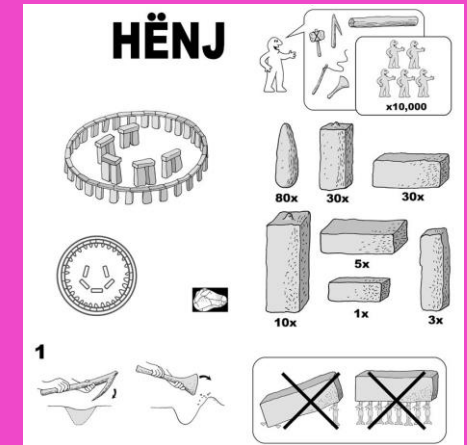
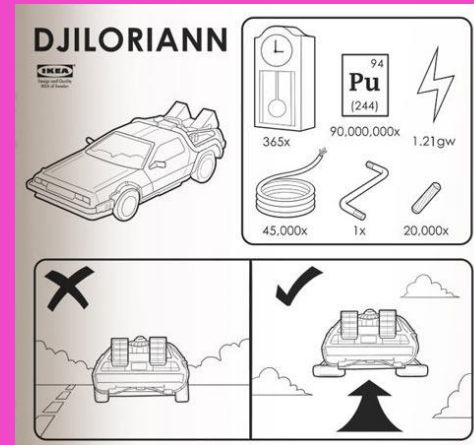
- Small systems – not much
- Big systems – rate of implementation
- Consequences of good/bad documentation?

In general development, it is Very important to!

- User documentation is a crucial part of a system as it is the document that explains the working of the system to the user.
- A well-made user documentation guides the user through using the system and thus increases productivity. If the user documentation is simple, system implementation can happen faster because users require less training to learn how to use the new system.
- User are non-technical people, they only need to know how to use the system. Therefore, the user documentation does not involve detailed explanations of how the system works.

¿What is involved? A user documentation usually involves:

- Minimum hardware and software requirements
- Installation guide
- How to start the system
- How to use different features of the system
- Screenshots explaining main features of the system
- Example inputs and outputs
- Explanations of error messages and troubleshooting guides
- Information to contact the developer of the system if an undocumented question arises



Topic 1.1.9 – (User Focus) Evaluate different methods of providing user documentation

Types of user documentation:

- Help files
- Online support
- Printed manuals

Help Files: *Files supplied together with the system. They can usually be called up with a button in the system.*

Advantage:

- Accessible at any time when using the program
- Give general instructions on how to use the system
- Give general instructions on how to solve some major errors

Disadvantages:

- They can only be used after system has been installed. They don't give any help when installing the solution
- They often only deal with very general errors
- They often lack a search capability, you have to look to find help for your problem

Topic 1.1.9 – (User Focus) Evaluate different methods of providing user documentation

Types of user documentation:

Online Support: *Special web service hosted by the system's developer to provide user documentation*

Advantage:

- They are often extensive compared to help files
- They get continuously revised by the systems developer to deal with the problem occurring most often (FAQs)
- They often provide an option for live support, talking to a real human operator if a problem arises which the user documentation has no answer to
- They often have search capabilities built-in so that users can easily search through them

Disadvantages:

- They are useless if users have no internet connection
- Live support does not work quite well with users unfamiliar with computers when they have to explain their problem ("I clicked "that" button and then something happened!")

Printed Manuals: *Manuals printed on paper and supplies together with the system*

Advantage:

- They can be read through by users before starting to work with the new system
- Always available
- Give help installing the system

Disadvantages:

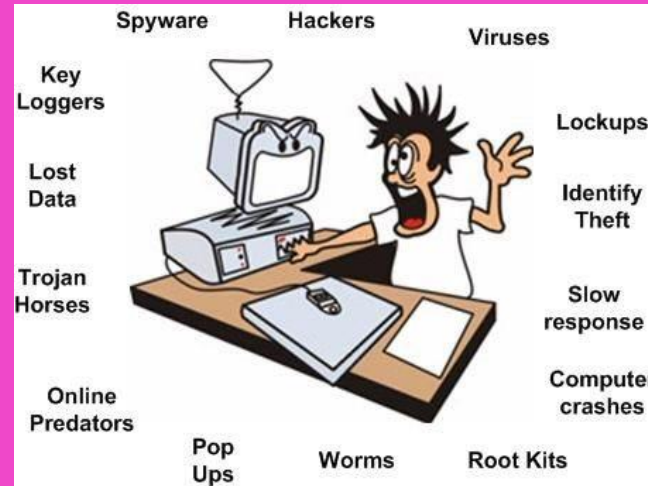
- Can be lost
- Often limited to a little booklet supplying little information apart from how to install the system
- May not be updated every time the system is updated

Topic 1.1.10 – (User Focus) Evaluate different methods of delivering user training

Methods of delivering user training

- Training staff in using a new system is very important as productivity greatly depends on how familiar users are with a system. Therefore good user training is an essential part of introducing a new system.
- **Self-instruction:** Users reading a manual or watching a tutorial, or randomly doing something in the system to figure out how it works. This type of training is only suitable for experienced computer users as they are more confident to start using an unfamiliar system alone to figure out how it works
- **Formal classes:** Users sitting in a classroom listening to an instructor who shows and explains how to use the system. This type of training is useful to train large amounts of staff as it is effective and relatively cheap, but if the size of the classes is too big, there is little time to deal with individual problems and questions.
- **Remote/Online/Personal training:** An instructor training a single user either by being in the same room or by some kind of remote connection (Skype, chat). This is the most effective way of training as training can be suited to user's needs and abilities, but is very expensive compared to other types of training.

Topic 1.1.11 – (System backup) identify a range of cause of **data loss**



Causes of data loss:

- Power out during storm
- Defect hard-drives
- System crashes
- Malicious activities by employees or outsiders/intruders
- Etc.....

Topic 1.1.13 – (System backup) Describe a range of **methods** that can be used to **prevent data loss**

!!!Back it up!!!

- **Regular back ups:** by copying all sensitive information on to a different medium than the one used in the system, like a second hard disk or CDs, chance or information loss can be reduced significantly. By storing these media physically separated from system, data loss due to malicious activities can be prevented as well. In the case of very sensitive information of large companies like Google, information is often duplicated on servers separated by large distances and in different climates to reduce the chance of data loss due to environmental causes such as tornado or earthquake.

Topic 1.1.13 – (System backup) Describe a range of **methods** that can be used to **prevent data loss**

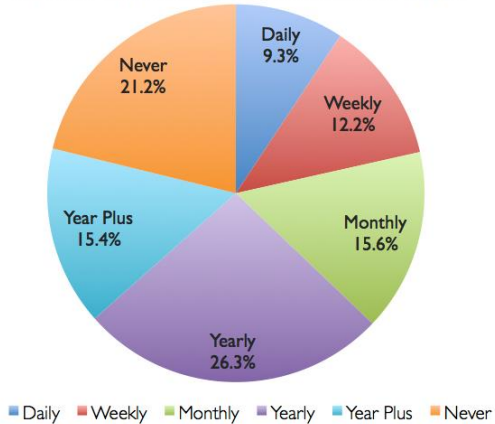
!!!Back it up!!!

- **Making Hard Copies:** in some cases, information can also be printed out to be archived, like books, text, important contracts or scientific papers. However creating hard copies can be expensive and take up large amount of space. Hard copies are also liable to data loss, as in the case of print outs getting burned in a fire.

BACKUPS AND WHO DOES THEM?

Computer Data Backup Frequency for 2017

When asked: "How often do you backup all the data on your computer?"



■ Daily ■ Weekly ■ Monthly ■ Yearly ■ Year Plus ■ Never



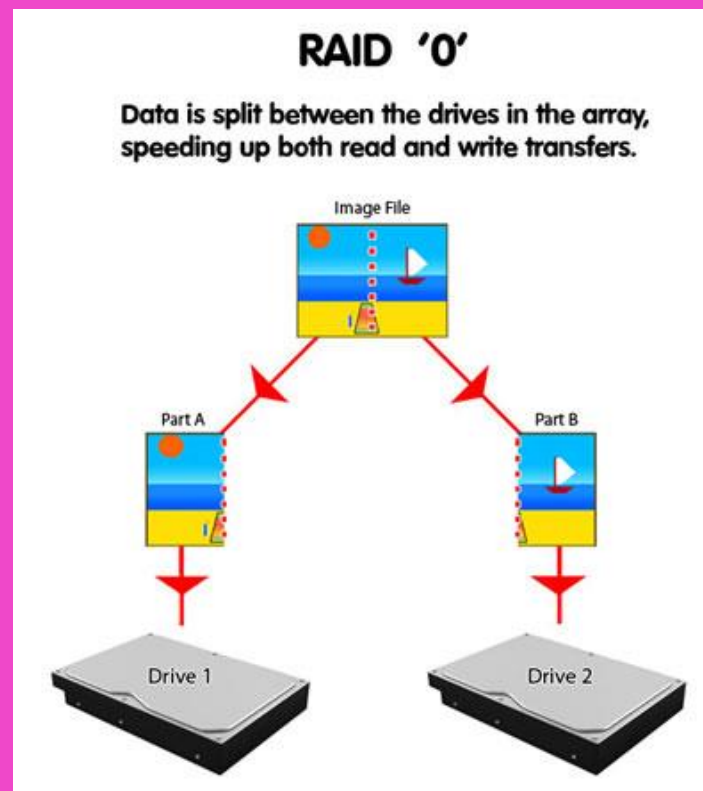
Lost your data?



Topic 1.1.13 – (System backup) Describe a range of **methods** that can be used to **prevent data loss**

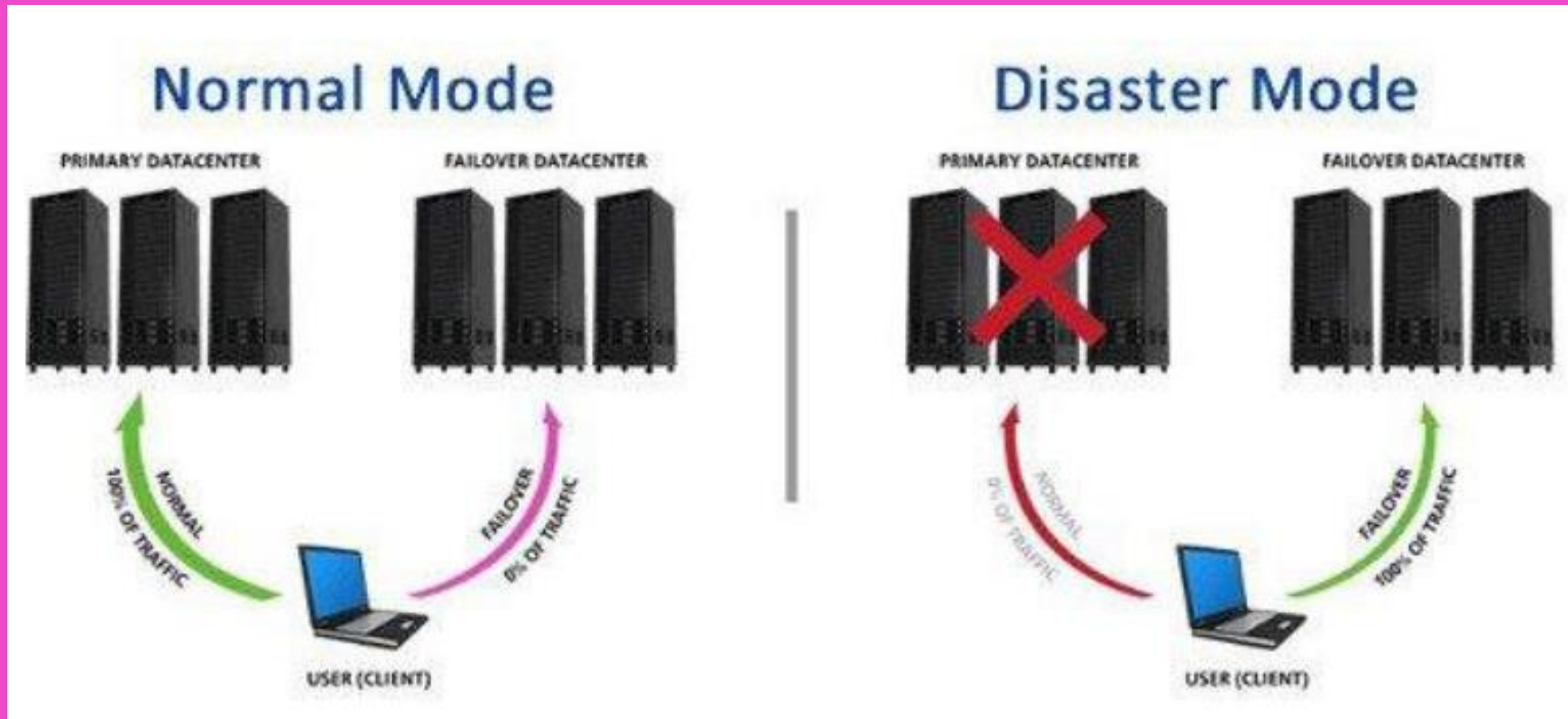
Methods to prevent data loss:

- Fail over system
- Redundancy
- Removable media
- Offsite/online storage
- Physical security

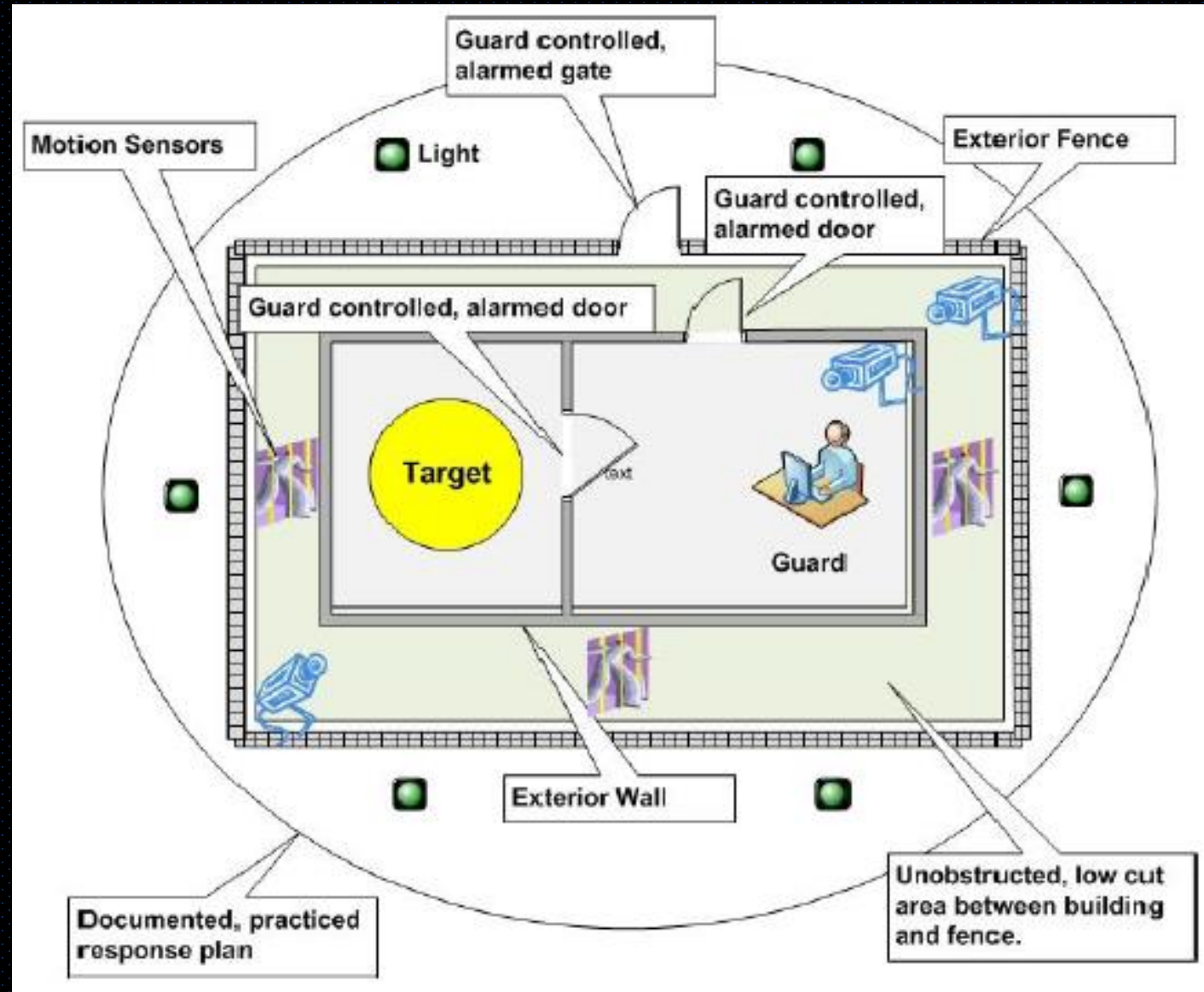


Topic 1.1.13 – (System backup) Describe a range of **methods** that can be used to **prevent data loss**

Failover / Redundancy:



Topic 1.1.13 - Physical Security



Topic 1.1.14 – (Software Deployment) Describe strategies for managing releases and updates

Types of updates:

Automatic updates		Manual updates	
<i>The system checks automatically for updates over the internet from time to time. If updates are available, they are downloaded and installed automatically</i>		<i>The software manufacturer contacts every user about the new update and supplies the installation package to him to be installed.</i>	
Advantages: <ul style="list-style-type: none">• Updates get installed automatically. Inexperienced users can have an easy chance to get the updates• No need for software manufacturer to contact every user about the new updates	Disadvantages <ul style="list-style-type: none">• User miss updates if they are not connected to the internet• If updates bring a major change system functions, users might not be informed about it	Advantages <ul style="list-style-type: none">• Users have more control of what updates they want to install• Users get to know if an update brings major changes to how the system works	Disadvantages <ul style="list-style-type: none">• Users might miss an update fixing security issues• Users might not know how to install the update• Users might harm system by wrong installing update• Users might lose medium containing the update