INCREASING RELIABILITY AND SAFETY

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REASONS OF COMPUTER FAILURE

A- The job they are doing is naturally difficult

- At the beginning computer were made for simple daily task like mathematical computation, providing straight answer.

- Now the computer systems interact with the real world (both machinery and unpredictable humans) and include complex communications networks, numerous features and interconnected subsystems and large ones.

B- The job is done poorly

This is happening from the system design and implementation to the management and use.

+ **System design and development**
  - × Inadequate attention to potential safety risks
  - × Interaction with physical devices that do not work as expected
  - × Incompatibility of software and hardware or of application software and the operating system.
  - × Reuse of software from another system without adequate checking (Ariane 5 rocket, "No Fly" lists: Joseph Adams)
  - × Overconfidence in software
  - × Carelessness

+ **Management and use**
  - × Data-Entry errors
  - × Inadequate training of users
  - × Errors in interpreting results or output
  - × Failure to keep information in databases up to date
  - × Overconfidence in software by users
  - × Insufficient planning for failures, no backup systems or procedures

PROFESSIONAL TECHNIQUES TO INCREASE RELIABILITY AND SAFETY

A- Software engineering and professional responsibility

- Improve specifications, design, implementation, Documentation, testing

- Reinforce software engineer skills on safety-critical applications

- Careful planning and good management

- Honest communication between software development company, the company and the client

B- User Interfaces and human factors

- Being able to anticipate potential human errors or inadvertent actuation, and counter-balance those with and appropriate procedure.

- User interfaces must provide clear and coherent instructions and error messages.

- The user interface must be consistent (Airlines Flight 965 crashed. Near California)

C- Redundancy and self-checking

D-Testing

LAW, REGULATION AND MARKETS

A- Criminal and Civil penalties

B- Warranties for consumer software

C- regulation and safety-critical applications

D- professional licensing

E- Taking responsibility

CONCLUSION

- We are too dependent on computers

- We are exposing ourselves to tremendous risk and dangers

- There is a real need to develop more proficient systems that will make software more reliable and flawless