COLLEGE OF
COMPUTER STUDIES

QUEZON CITY
UNIVERSITY

WEEK 3
RELEVANCE OF HCI

Learning Outcomes

- Understand the relevance of HCI and why it is important
- Explain the design rules for HCI
- Elaborate its principles and guidelines.

Why is HCI important?

- The study of our interface with information.
- It is not just ‘how big should I make buttons’ or ‘how to layout menu choices’
- It can affect
  - Effectiveness
  - Productivity
  - Morale
  - Safety

Example: a car with poor HCI

- Take 5 minutes for everyone to write down one common device with substantial HCI design choices and discuss the pros and cons. How does it affect you or other users?

- HCI takes advantage of our everyday knowledge of the world to make software and devices more understandable and usable for everyone.

For example, using a graphic of a miniature folder in a computer's interface helps the user understand the purpose of the folder, as everyone has experience with real paper folders in their everyday lives.

- Ultimately, if a system is well designed with HCI techniques, the user should not even have to think about the intricacies of how to use the system. Interaction should be clear, intuitive, and natural.

HCI in our daily life

- Today technologies permeate every aspect of our daily lives. Even if a person does not directly own or use a computer, their life is affected in some way by computing.
- ATM machines, train ticket vending machines, and hot drinks dispensing machines are just a few examples of computer interfaces a person can come into contact with daily without needing to own a personal computer.

Business and Industry

- HCI is an important consideration for any business that uses technology or computer in their everyday operation. Well-designed usable systems ensure that staff are not frustrated during their work and as a result are more content and productive.
- HCI is especially important in the design of safety critical systems, such as, for example, those found in power plants, or air traffic control centers. Design errors in these situations can have serious results, possibly resulting in the death of many people.

Accessibility

- HCI is a key consideration when designing systems that are not only usable, but also accessible to people with disabilities. The core philosophy of HCI is to provide safe, usable, and efficient systems to everyone, and this includes those with different sets of abilities and different ranges of expertise and knowledge.
- Any system properly designed with HCI user-centered techniques and principles will also be maximally accessible to those with disabilities.

Software Success

- Good use of HCI principles and techniques is not only important for the end user, but also is a very high priority for software development companies. If a software product is unusable and causes frustration, no person will use the program by choice, and as a result sales will be negatively affected.

Untrained users

- Today, very few computer users actually read the manual accompanying the software, if one exists. Only very specialized and advanced programs require training and an extensive manual.
- Computer users expect to understand the main functionality of an average program within a few minutes of interacting with it. HCI provides designers with the principles, techniques, and tools necessary to design effective interfaces that are obvious and easy to use, and do not require training.

Design Rules for HCI

- **Design principles**: high-level and context-free design goals based on theories of human computer interaction.

- **Design guidelines**: specific and usually context dependent rules for designers to follow in order to achieve the principles.

Design Principles

- Improve users task performance and reduce their effort.

- User activity depends on memory and attention.

- Automate or partially automate the user activity and to do so with minimal user effort.

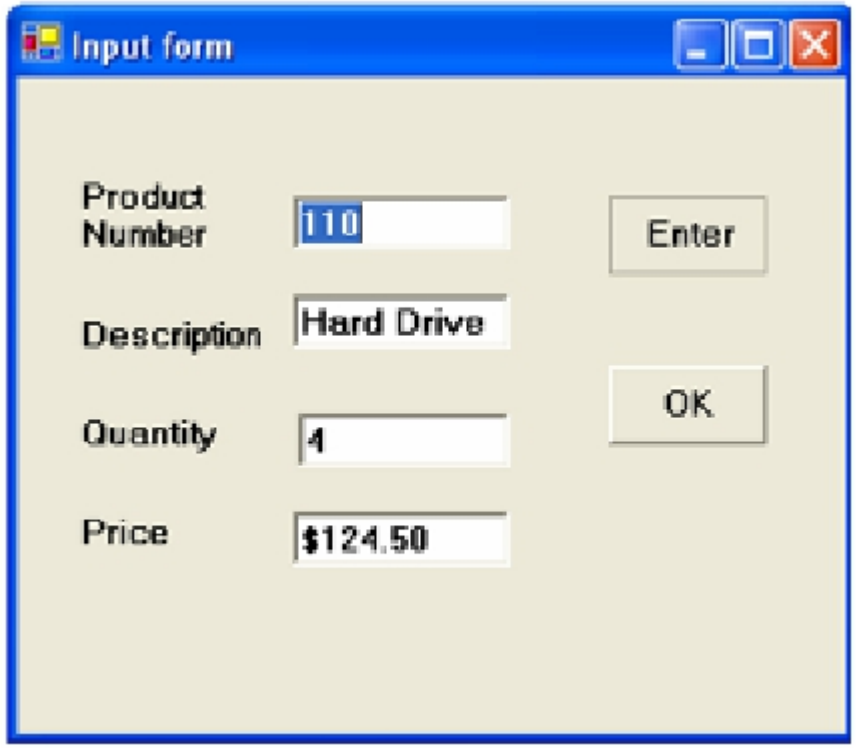
- Often compromises in functionality produce higher usability.

Example: Incorrect entry in any online form should not result in filling up the whole form again. Except incorrect entry,

- Strive for fit between the information representation needed and presented.
- Representation: a simplified depiction of a real world phenomenon.
- Functionality: the set of activities.
- Usability: a measure of ease.
- Cognitive fit: system's representation of the problem supports the user's strategies for performing the task.

- Provide and constrain affordances to capture real-world knowledge.

- Affordance: the aspects of an object that the user perceives as indicating how to use the object, e.g., the handle of a teapot.



Affordance in the design of buttons – the OK button invites you to push it

- Design for error

- Error: a faulty action due to incorrect intention (mistake) or to incorrect or accidental implementation of the intention (slip), e.g., one can use the ‘reply all’ in an email by mistake, not knowing that everyone on the list will see the reply, or accidentally clicking on the wrong icon because of lack of sufficient attention.

Laboratory Time for the next slides

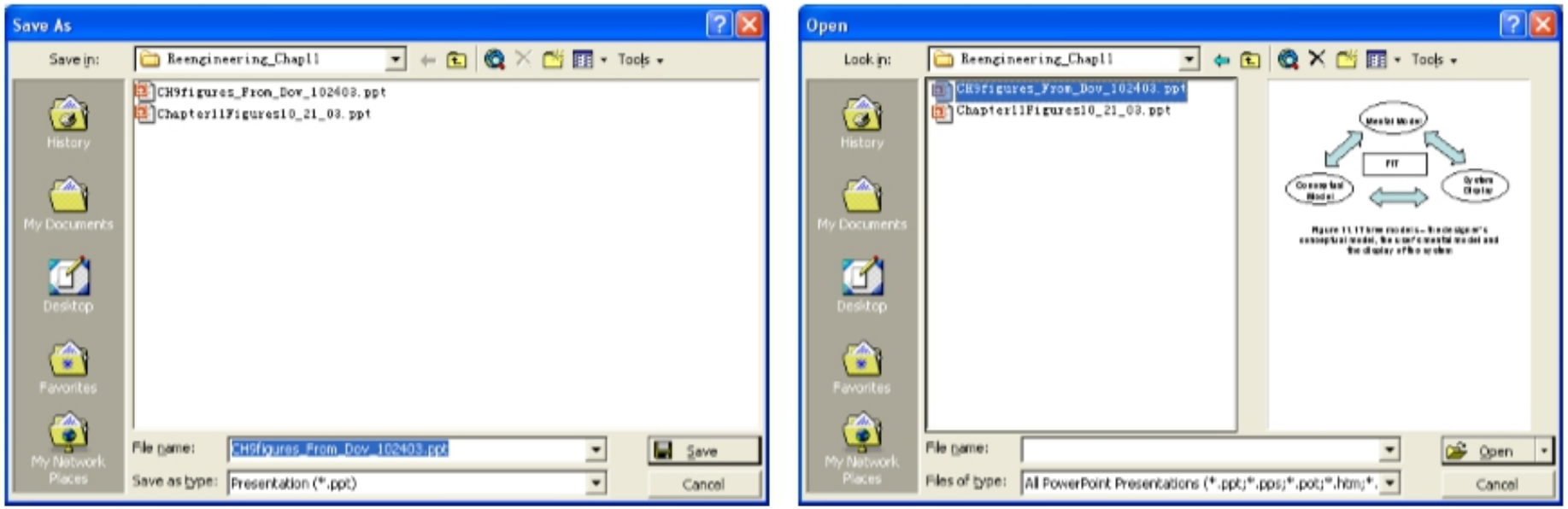
Design Guidelines

- Issue I: Consistency Guidelines

Consistency has been one of the cardinal rules of design. If the interface is consistent (even if poorly designed), the end user can adapt to it. Is consistency as important as it appears?

There are several types of consistency.

- Internal consistency: the same appearance, meaning and operation holds true for all the user's interactions within the same application.

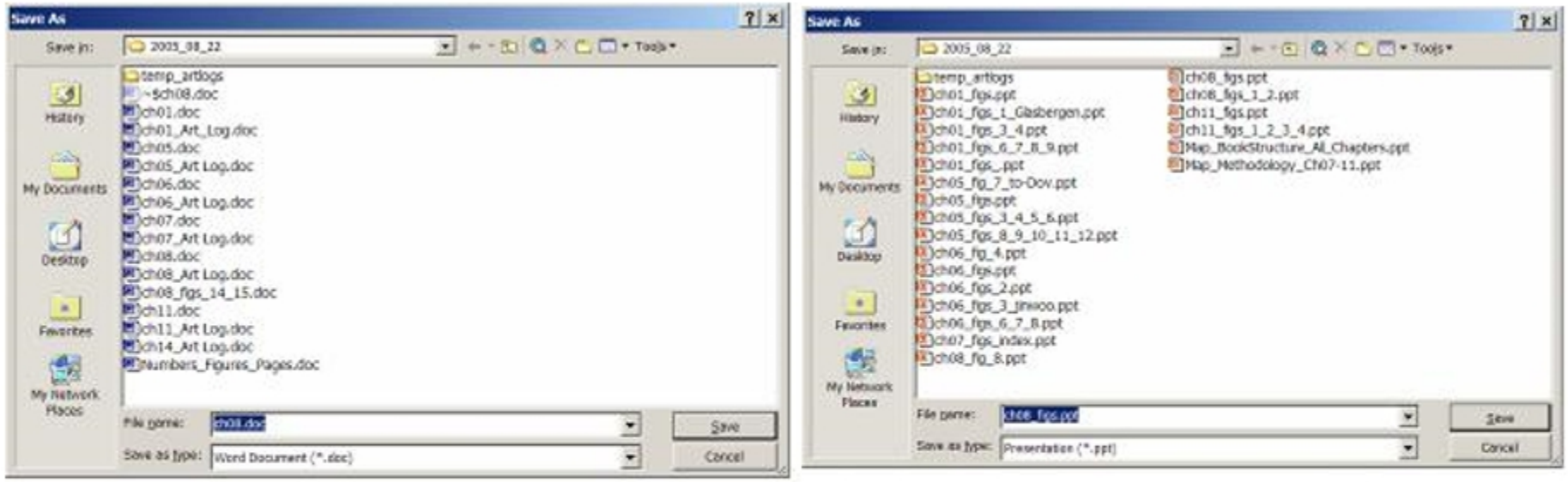


"Save as" and "Open" dialogue boxes in MS PowerPoint illustrating internal consistency

- Analogical consistency: the correspondence between the system's representation and the real-world phenomenon in terms of appearance, meaning and operation.

Recycle bin in the Microsoft® Windows® environment illustrating analogical consistency

- External consistency: the same appearance, meaning and operation holds true for the user's interactions across applications.
  Example :-Use of Cut, Copy, Paste shortcut keys has same operation in all the applications.



"Save as" dialog boxes in Microsoft® Word® and Microsoft® PowerPoint® illustrating external consistency.

Design Rules for Consistency

- Standardization of interface designs: follow accepted (usually published) guidelines whenever possible.
- Stability: do not change something unless it really needs changing.
- Training: add new skills to the user's skill set rather than expecting the user to modify existing skills. If you must change, make it a large and obvious one.
- Consistent interpretation of user behavior by the system is more important than consistent system objects or behaviors.

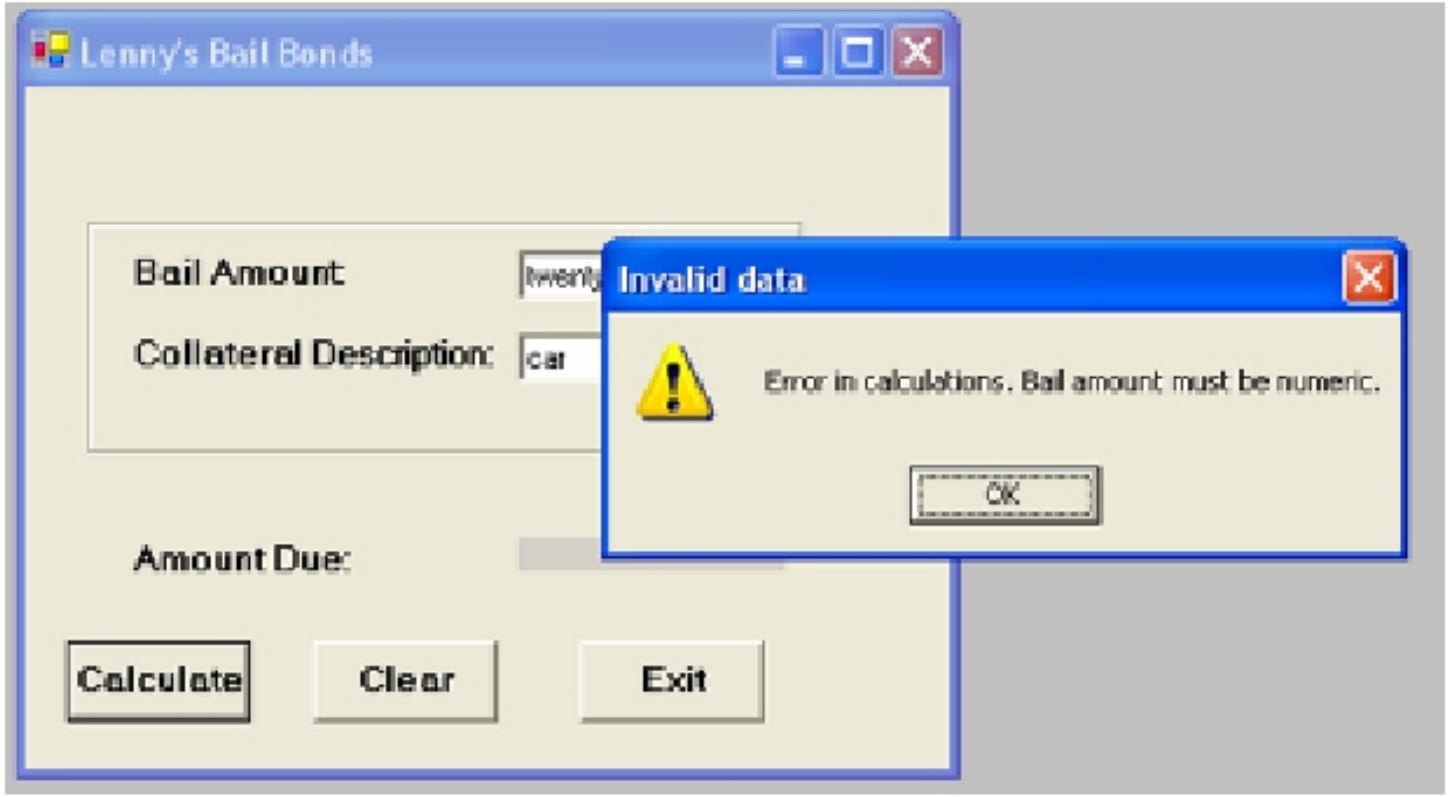
Issue II - User control and feedback

- Control and feedback go hand in hand. Providing feedback is probably the most accepted guideline in the design of any interaction.
- However, it is important to understand the rationale for each specific feedback instance.
- Feedback can support three important factors of user activity: motivation, control and learning.

- Control feedback is designed to promote the user's control over the interaction and the completion of the task at hand.
- The first guideline is therefore to ensure that the user perceives that he or she is in control.
- For example, the user should always be able to abort one activity and initiate another (the system should not 'take over' control).
- Furthermore, the user should be able to control the pace and format of presentation (e.g., controlling the speed of scrolling and the size of the font).

Design rules for feedback to promote control

- Feedback should correspond to goals and intentions.
- Feedback should help evaluate goal accomplishment.
- Feedback should be sufficiently specific to control user activity.
- Feedback should help develop accurate mental models.
- Feedback should fit the task representation (verbal and visual).
- Feedback should fit the type of behavior (controlled, automatic).



User feedback

Issue III - Metaphors

- Metaphor: the use of familiar terms and associations to represent a new concept.

- The metaphor of the ‘Desktop’ is one of the most commonly used metaphors in HCI.

Metaphors

Metaphor	Application
Typewriting (typing, using keyboard)	Word processor
Document (elements of a document and their attributes and operations).	Desk top publishing
Ledger sheet (matrix structure for numbers)	Spreadsheet
Drawing (with paper, pencil and palettes).	Drawing and painting
Table of data (managing data organized in rows and columns).	Database

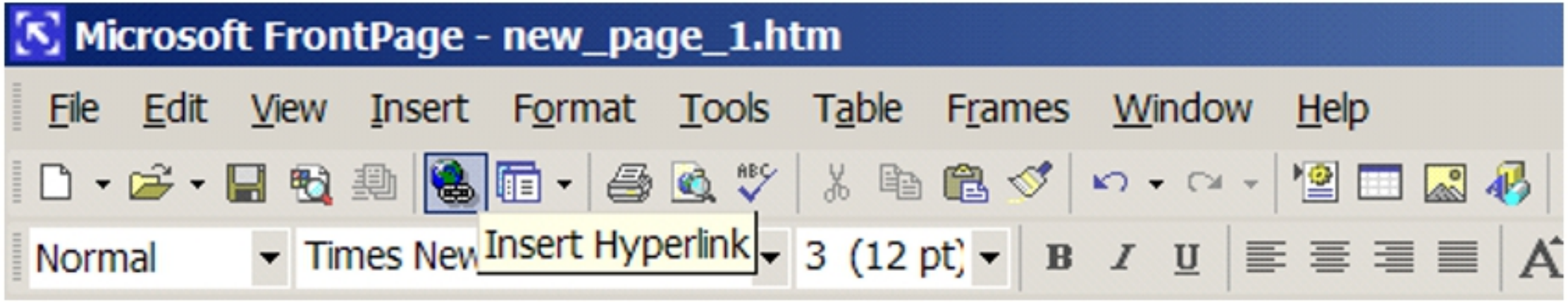


Figure 8. 10 depicts a metaphor. It is a globe with a chain link over it.

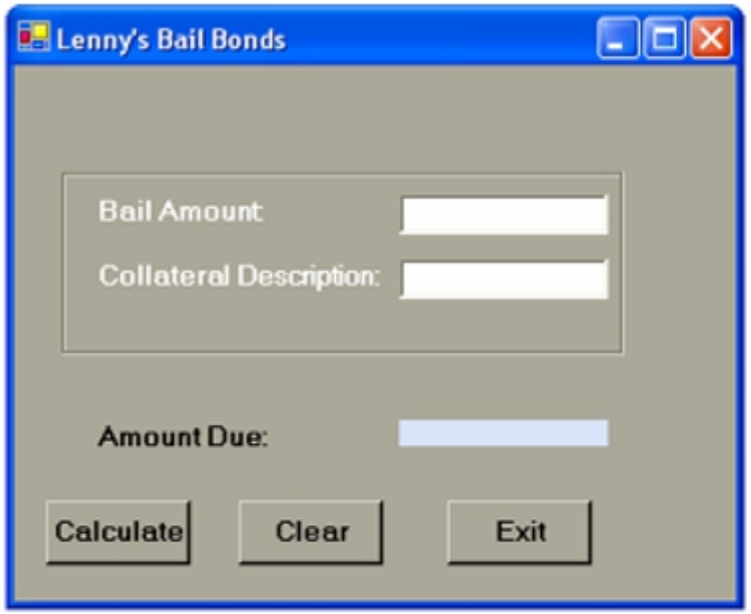
Issue IV – Direct Manipulation

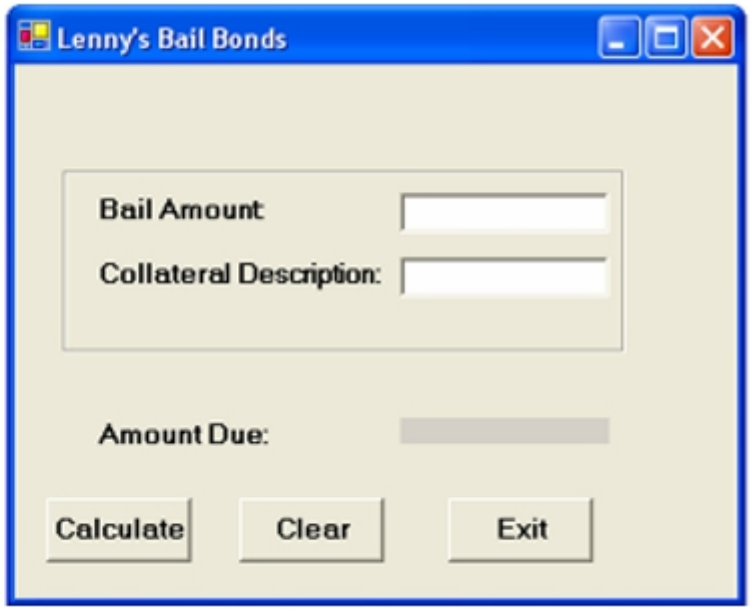
- Direct manipulation: an interaction style in which objects are represented and manipulated in a manner analogous to the real world (e.g. by directly pointing at an object and dragging it to a location rather than issuing logical instructions to bring about the same effect).
- The general guideline is to use direct manipulation whenever possible.

- Consider the simple example of moving a file to a trash bin by clicking on its icon and dragging it to the trash bin icon.
- Contrast this with the same action carried out by a sequence of menu options and commands (e.g. locating the appropriate directory of files, finding the exact name of the file, specifying a ‘delete’ command and receiving (at least in some operating systems) confirmation that ‘the file had been deleted’).

Issue V – Aesthetics in Screen Design

- Designs should be aesthetically pleasing ideally without compromising on the usefulness and usability of the system.





The End.