



Q1: Choose the correct answer

- [1]. Which of the following activities of a Generic Process framework provides a feedback report?
A) Communication B) Planning C) Modeling & Construction D) Deployment
- [2]. What is the major advantage of using Incremental Model?
A) Customer can respond to each increment
B) Easier to test and debug
C) It is used when there is a need to get a product to the market early
D) Easier to test and debug & It is used when there is a need to get a product to the market early
- [3]. Which one of the following is not a fundamental activity for software processes in software engineering?
A) Software Verification B) Software Validation C) Software design and implementation D) Software evolution
- [4]. Which one of the following is not a step of requirement engineering?
A) elicitation B) design C) analysis D) documentation
- [5]. The user system requirements are the parts of which document?
A) SDD B) SRS C) DDD D) SRD
- [6]. Which is one of the most important stakeholder from the following ?
A) Entry level personnel B) Middle level stakeholder C) Managers D) Users of the software
- [7]. Which one of the following is a functional requirement?
A) Maintainability B) Portability C) Robustness D) None of the mentioned
- [8]. "Consider a system where, a heat sensor detects an intrusion and alerts the security company." What kind of a requirement the system is providing?
A) Functional B) Non-Functional C) Known Requirement D) None of the mentioned
- [9]. What is the first step of requirement elicitation?
A) Identifying Stakeholder B) Listing out Requirements C) Requirements Gathering D) All of the mentioned

- [10]. **Why is Requirements Elicitation a difficult task?**
 A) Problem of scope B) Problem of understanding C) Problem of volatility D) All of the mentioned
- [11]. **Which of the following property does not correspond to a good Software Requirements Specification (SRS)?**
 A) Verifiable B) Ambiguous C) Complete D) Traceable
- [12]. **The Unified Modeling Language (UML) has become an effective standard for software modelling. How many different notations does it have?**
 A) Three B) Four C) Six D) Nine
- [13]. **Which model in system modelling depicts the dynamic behavior of the system?**
 A) Context Model B) Behavioral Model C) Data Model D) Object Model
- [14]. **Which model in system modelling depicts the static nature of the system?**
 A) Behavioral Model B) Context Model C) Data Model D) Structural Model
- [15]. _____ allows us to infer that different members of classes have some common characteristics.
 A) Realization B) Aggregation C) Generalization D) dependency
- [16]. _____ & _____ diagrams of UML represent Interaction modeling.
 A) Use Case, Sequence B) Class, Object C) Activity, State Chart D) All of the mentioned
- [17]. **Software evolution does not comprise:**
 A) Development activities B) Negotiating with client C) Maintenance activities D) Re-engineering activities
- [18]. **Aggregation represents _____.**
 A) is_a relationship B) part_of relationship C) composed_of relationship D) none of the mentioned
- [19]. **The process of developing a software product using software engineering principles and methods is referred to as, _____**
 A) Software myths B) Scientific Product C) Software Evolution D) none of the mentioned
- [20]. **Activities and action taken on the data that are represented by Circle or Round-edged Rectangles are called, _____.**
 A) Process B) Data storage C) Data flow D) Entities
- [21]. **The feature of the object oriented paradigm which helps code reuse is _____.**
 A) Object B) Class C) Inheritance D) Aggregation
- [22]. **In the requirement analysis which model depicts the information domain for the problem?**
 A) Data models B) Class-Oriented models C) Scenario-based models D) Flow-oriented models

- [23]. **Abbreviate the term SRS**
- | | | | |
|---------------------------------------|-------------------------------|-----------------------------|--------------------------|
| A) Software Requirement Specification | B) Software Refining Solution | C) Software Resource Source | D) none of the mentioned |
|---------------------------------------|-------------------------------|-----------------------------|--------------------------|
- [24]. **The process to gather the software requirements from Client, Analyze and Document is known as _____.**
- A) Requirement engineering process
 B) Requirement elicitation process
 C) User interface requirements
 D) Software system analyst
- [25]. **Which tools are used to represent the system components, data and control flow among various software components and a system structure in a graphical form?**
- | | | | |
|---------------------------|-------------------------------|------------------|------------------------|
| A) Process modeling tools | B) . Project management tools | C) Diagram tools | D) Documentation tools |
|---------------------------|-------------------------------|------------------|------------------------|
- [26]. **What is the designers may like to have list of all functional and non-functional requirements of GUI that can be taken from user and their existing software solution?**
- | | | | |
|------------------|------------------|------------------------------|--------------------------------|
| A) User analysis | B) Task analysis | C) GUI requirement gathering | D) GUI design & implementation |
|------------------|------------------|------------------------------|--------------------------------|
- [27]. **Software Requirement Specification should come up with following features:**
- A) User Requirements are expressed in natural language.
 B) Technical requirements are expressed in structured language, which is used inside the organization.
 C) Design description should be written in Pseudo code.
 D) All mentioned
- [28]. **System Analysts have which of these following responsibilities?**
- A) Analyzing and understanding requirements of intended software
 B) Understanding how the project will contribute in the organization objectives
 C) Identify sources of requirement
 D) All mentioned
- [29]. **Grouping of all functionally related elements is known as _____.**
- | | | | |
|-------------|-------------|---------------|--------------------------|
| A) Cohesion | B) Coupling | C) Both A & B | D) None of the mentioned |
|-------------|-------------|---------------|--------------------------|
- [30]. **The ability to encourage the technical people to produce their best ability is known as _____.**
- | | | | |
|-----------------|---------------|------------------------|--------------------------|
| A) Organization | B) Motivation | C) Ideas or innovation | D) None of the mentioned |
|-----------------|---------------|------------------------|--------------------------|
- [31]. **Which of the following is/are considered stakeholder in the software process?**
- | | | | |
|--------------|--------------|---------------------|----------------------|
| A) Customers | B) End-users | C) Project managers | D) all the mentioned |
|--------------|--------------|---------------------|----------------------|

- [32]. The process to gather the software requirements from Client, Analyze and Document is known as _____.
- A) Requirement engineering process B) Requirement elicitation process C) User interface requirements D) Software system analyst
- [33]. First level of prototype is evaluated by _____.
- A) Developer B) Tester C) User D) System Analyst
- [34]. Which of the items listed below is not one of the software engineering layers?
- A) Process B) Manufacturing C) Methods D) Tools
- [35]. What is the main aim of Software engineering?
- A) Reliable software B) Cost effective software C) Reliable and cost-effective software D) None of the mentioned
- [36]. For the best Software model suitable for the project, in which of the phase the developers decide a roadmap for project plan?
- A) Software Design B) System Analysis C) Coding D) Testing
- [37]. In Software validation, requirements can be checked against following conditions:
- A) If they can be practically implemented
 B) If they are valid and as per functionality and domain of software
 C) If there are any ambiguities
 D) all the mentioned
- [38]. In OOD, the attributes (data variables) and methods(operation on the data) are bundled together is called. _____
- A) Classes B) Objects C) Encapsulation D) Inheritance
- [39]. Which design defines the logical structure of each module and their interfaces that is used to communicate with other modules?
- A) High-level designs B) Architectural designs C) Detailed design D) All mentioned designs
- [40]. Find out which phase is not available in SDLC?
- A) Coding B) Testing C) Maintenance D) Abstraction
- [41]. OOD languages provide a mechanism where methods performing similar tasks but vary in arguments, and that can be assigned to the same name is called _____
- A) Classes B) Object C) Polymorphism D) Encapsulation
- [42]. Which phase is referring to the support phase of software development?
- A) Acceptance Phase. B) Testing C) Maintenance D) None of the mentioned
- [43]. Which model is also called as the classic life cycle or the Waterfall model?
- A) Iterative Development B) Linear Sequential Development C) RAD Model D) Incremental Development

- [44]. Which document is created by system analyst after the requirements are collected from Various stakeholders?
- A) Software requirement specification
 - B) Software requirement validation
 - C) Feasibility study
 - D) Requirement Gathering
- [45]. Which is focused towards the goal of the organization?
- A) Feasibility study
 - B) Requirement gathering
 - C) Software requirement specification
 - D) Software requirement validation
- [46]. Which model is also known as Verification and validation model?
- A) Waterfall model
 - B) Big Bang model
 - C) V-model
 - D) Spiral model
- [47]. Software project management is the process of managing all activities that are involved in software development, such as ____.
- A) Time
 - B) Cost
 - C) Quality
 - D) All mentioned management
- [48]. What is the meaning of requirement elicitation in software engineering?
- A) Gathering of requirement
 - B) Understanding of requirement
 - C) Getting the requirements from client
 - D) All mentioned
- [49]. What is legacy system?
- A) A legacy system refers to newer version of software
 - B) A legacy system refers to outdated application software that is used instead of available upgraded versions
 - C) A legacy system always devolved by advance technology
 - D) None of the mentioned
- [50]. Which software is used to control products and systems for the consumer and industrial markets?
- A) System software
 - B) Artificial intelligence software
 - C) Embedded software
 - D) Engineering and scientific software
- [51]. In which elicitation process the developers discuss with the client and end users and know their expectations from the software?
- A) Requirement gathering
 - B) Organizing requirements
 - C) Negotiation & discussion
 - D) Documentation
- [52]. If requirements are easily understandable and defined then which model is best suited?
- A) Spiral model
 - B) Waterfall model
 - C) Prototyping model
 - D) None of the mentioned

- [53]. **RAD Software process model stands for _____**
- A) Rapid Application Development
 - B) Relative Application Development
 - C) Rapid Application Design
 - D) Recent Application Development
- [54]. **Which of the following is not defined in a good Software Requirement Specification (SRS) document?**
- A) Functional Requirement
 - B) Nonfunctional Requirement
 - C) Goals of implementation
 - D) Algorithm for software implementation
- [55]. **What is the simplest model of software development paradigm?**
- A) Spiral model
 - B) Big Bang model
 - C) V-model
 - D) Waterfall model
- [56]. **Which design identifies the software as a system with many components interacting with each other?**
- A) Architectural design
 - B) High-level design
 - C) Detailed design
 - D) Both B & C
- [57]. **Give the disadvantages of modularization.**
- A) Smaller components are easier to maintain
 - B) Program can be divided based on functional aspects
 - C) Desired level of abstraction can be brought in the program
 - D) None of the mentioned
- [58]. **Mention any two indirect measures of product.**
- A) Quality
 - B) Efficiency
 - C) Accuracy
 - D) Both A and B
- [59]. **Which one of the following models is not suitable for accommodating any change?**
- A) Prototyping Model
 - B) RAD Model
 - C) Build & Fix Model
 - D) Waterfall Model
- [60]. **Usability can be measured in terms of:**
- A) Time required to become moderately efficient in system usage
 - B) Net increase in productivity
 - C) Intellectual skill to learn the system
 - D) All of the mentioned

Q2: True or False

- [1]. **Software costs more to maintain than it does to develop.**
A) True B) False
- [2]. **Component-based Software Engineering allows faster delivery.**
A) True B) False
- [3]. **A Use-case actor is always a person having a role that different people may play.**
A) True B) False
- [4]. **A stakeholder is anyone who will purchase the completed software system under development.**
A) True B) False
- [5]. **Functional requirements capture the intended behavior of the system.**
A) True B) False
- [6]. **Requirements elicitation is a cyclic process**
A) True B) False
- [7]. **Requirements Analysis is an Iterative Process.**
A) True B) False
- [8]. **Requirements should specify 'what' but not 'how'.**
A) True B) False
- [9]. **Activity diagrams are used to model the processing of data.**
A) True B) False
- [10]. **Software is not considered to be collection of executable programming code, associated libraries and documentations.**
A) True B) False
- [11]. **Modelling is a representation of the object-oriented classes and the resultant collaborations will allow a system to function.**
A) True B) False
- [12]. **Application of science, tools and methods to find cost effective solution to the problems is a definition of software engineering.**
A) True B) False
- [13]. **Software design is a process to transform user requirements into some suitable form, that helps the programmer in software coding and implementation.**
A) True B) False
- [14]. **Requirements can be gathered from users via interviews, surveys, task analysis, brainstorming, domain analysis, prototyping, studying existing usable version of software, and by observation.**
A) True B) False

- [15]. **A good design review is not important for good software design and its accuracy and quality.**
A) True B) False
- [16]. **Software components provide interfaces, which can be used to establish communication among different components.**
A) True B) False
- [17]. **Refinement is actually a process of elaboration.**
A) True B) False
- [18]. **Modularization is a technique to divide a software system into multiple discrete and independent modules.**
A) True B) False
- [19]. **SRS is a document created by system developer after the requirements are collected from various stakeholders.**
A) True B) False
- [20]. **Reliability is measured by considering processing speed, response time, resource consumption, throughput, and efficiency.**
A) True B) False

with my best wishes Dr: Reda M. Hussien



SE331 Software Design and Architecture (Final Exam) (60 Points)

Answer the Following Questions

Question One:

(15 Points)

"Ecommerce, also known as electronic commerce or internet commerce, refers to the buying and selling of goods or services using the internet, and the transfer of money and data to execute these transactions. Ecommerce is often used to refer to the sale of physical products online, but it can also describe any kind of commercial transaction that is facilitated through the internet".

1. Perform static structuring using repository pattern and filter pattern.
2. Perform control modeling. How should events be handled?
3. Draw Functional, Information, Development and Deployment Views.
4. State the impact of Security perspective on Functional, Information, Development and Deployment Views.

Question Two:

(15 Points)

"A car rental, hire car, or car hire agency is a company that rents automobiles for short periods of time, generally ranging from a few hours to a few weeks. It is often organized with numerous local branches (which allow a user to return a vehicle to a different location), and primarily located near airports or busy city areas and often complemented by a website allowing online reservations".

1. Which patterns would improve your system performance in this case?
2. Draw class diagram and write Java code.

Question Three:

(10 Points)

1. An Educational Software supplier has partnered with a college to develop a course content management system. Who are our stakeholders?
2. "Online banking, also known as internet banking or web banking, is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution's website. The online banking system will typically connect to or be part of the core banking system operated by a bank and is in contrast to branch banking which was the traditional way customers accessed banking services". Draw Context view for Online Banking System.

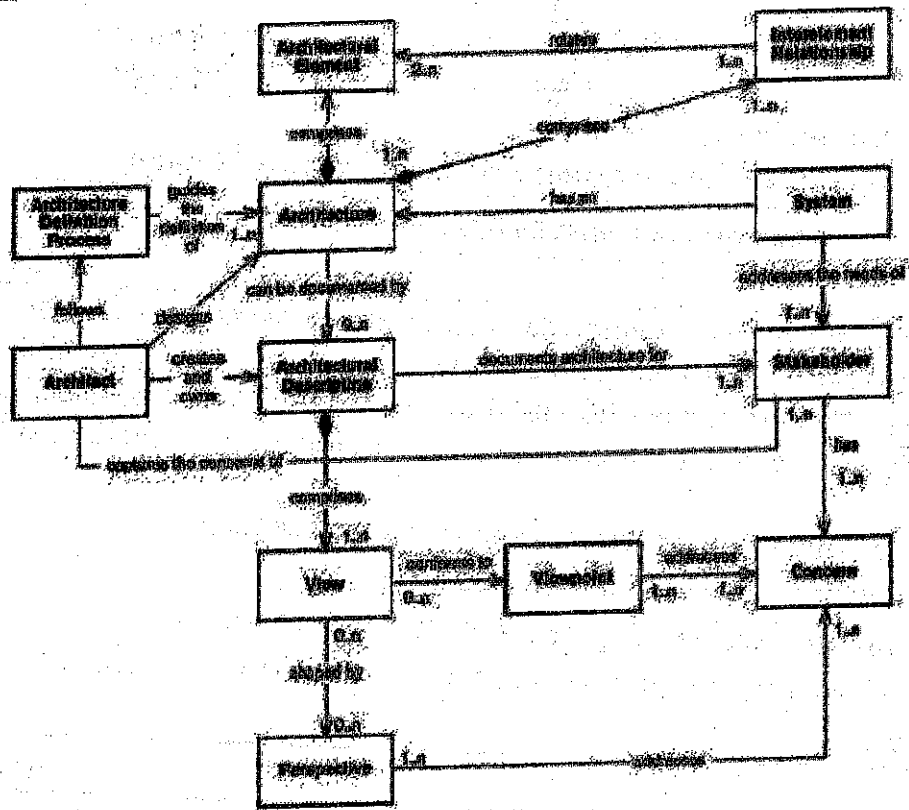
Question Four:

(8 Points)

1. State the main steps of architecture definition process (List aims, inputs and outputs for each step.
2. State the main differences between architecture, requirements, and design.

Question Five: Explain the Following Figure

(7 Points)



Question Six: Is this a valid implementation of a proxy pattern? Explain your answer. [5 marks]

1. public class ProxyImage implements Image
2. {
3. public RealImage realImage;
4. public String fileName;
5. private ProxyImage(String fileName)
6. {
7. this.fileName = fileName;
8. }
9. @Override
10. private void display()
11. {
12. if(realImage == null)
13. {
14. realImage = new RealImage(fileName);
15. }
16. realImage.display();
17. }
18. }

Best Wishes
Dr/ Amr Ali Abohany
Assistant Professor of Information Systems



Answer the following Questions

Q1. Modeling the problem below and solve it graphically? (20 Marks)

A firm manufactures headache pills in two sizes A and B. Size A contains 4 grains of element X, 7 grains of element Y and 2 grain of element Z; size B contains 2 grain of element X, 10 grains element Y and 8 grains of element Z. It has been found by users that it requires at least 12 grains of element X, 74 grains of element Y and 24 grains of element Z for providing immediate effects. Determine graphically the least number of pills a patient should have to get immediate relief. Formulate the problem as LPP.

Q2. Using simplex method to solve the following? (15 Marks)

$$\text{Max } Z = 12X_1 + 16X_2$$

Subject to

$$10X_1 + 20X_2 \leq 120$$

$$8X_1 + 8X_2 \leq 80$$

$$X_1 \geq 0, X_2 \geq 0$$

Q3. Using Integer Linear Programming to solve the following? (13 Marks)

$$\text{Max } Z = 5X_1 + 6X_2$$

Subject to

$$X_1 + X_2 \leq 5$$

$$4X_1 + 7X_2 \leq 28$$

$$X_1 \geq 0, X_2 \geq 0$$

$$X_1, X_2 \text{ are integer}$$

Q4. (12 Marks)

The computer lab at State University has a help desk to assist students working on computer spreadsheet assignments. The students patiently form a single line in front of the desk to wait for help. Students are served based on a first-come, first-served priority rule. On average, 15 students per hour arrive at the help desk. Student arrivals are best described using a Poisson distribution. The help desk server can help an average of 20 students per hour, with the service rate being described by an exponential distribution. Calculate the following operating characteristics of the service system.

- The average utilization of the help desk server
- The average number of students in the system
- The average number of students waiting in line
- The average time a student spends in the system
- The average time a student spends waiting in line
- The probability of having more than 4 students in the system

With my best wishes;

Dr. Haitham Samy Elwahsh



Departments: IS, IT, SE

(28 Marks)

(I) Chose the correct answer for the following sentences, write only the choice:

- (1) is the property which returns the number of Tab pages.
(a) TabPages (b) TabNumbers (c) TabCount (d) Nothing of them
- (2) is the property which returns the collection of Tab pages within TabControl.
(a) ItemSize (b) TabPages (c) TabCount (d) Nothing of them
- (3) is a property which is enumeration that controls image sizing and positioning. Values are Normal (default), StretchImage, AutoSize, CenterImage, and Zoom.
(a) ImageSize (b) SizeMode (c) Image (d) Nothing of them
- (4) is a property in NumericUpDown control, that specifies by how much the current number changes when user clicks up and down arrows.
(a) DecimalPlaces (b) Maximum (c) UpDownAlign (d) Nothing of them
- (5) is a common method for TreeNode which expands all the children of a node.
(a) Expand (b) GetNodeCount (c) Nodes (d) Nothing of them
- (6) is a property for TreeView which returns the collection of TreeNodes in the control, and it contains methods Add, Clear, and Remove.
(a) ImageList (b) GetNodeCount (c) Nodes (d) Nothing of them
- (7) is a property which determines the type of ComboBox. One of its values is Simple.
(a) Items (b) DropDownStyle (c) Style (d) Nothing of them
- (8) is a property which if it is true, the link appears as though it has been visited and its color is changed.
(a) VisitedLinkColor (b) LinkColor (c) LinkVisited (d) Nothing of them
- (9) is a property specifies the amount of time (in milliseconds) between which two different tool tips appear when the mouse is moved from one to another.
(a) InitialDelay (b) ReshowDelay (c) AutoPopDelay (d) Nothing of them
- (10) is a property specifies by how much the current number in the control changes when the user clicks the control's up and down arrows.
(a) DecimalPlaces (b) MaximumNumber (c) UpDownAlign (d) Increment
- (11) is a property specifies which portion of text in the LinkLabel is part of the link.
(a) LinkVisited (b) LinkBehavior (c) Text (d) Nothing of them
- (12) is property specifies text that should appear beside a menu item for a shortcut key. The text in this property is displayed for the shortcut key.
(a) CheckOnClick (b) ShowShortcutKeys (c) ShortCutKeys (d) Nothing of Them

(II) Put sign(✓) at correct and sign(×) at wrong with correction the wrong sentence:

- (1) *IsMdiChild* property returns the MDI children as an array of forms.
- (2) *UseMnemonic* is property for LinkLabel which if it is true, the & character in the text property acts as a shortcut.
- (3) In *AcceptsReturn* is property, if is true, the textbox has gray background, and its text cannot be edited.



Departments: *IS, IT, SE*

- (4) *ScrollBars* is property, if it is true in multiline *TextBox*, pressing *Enter* creates a new line in *TextBox*.
- (5) *ButtonStyle* is a property which modifies a *Button's appearance*, its default value is standard.
- (6) *InitialDelay* is a property which determines the *amount* of time (in *milliseconds*) that the *tool tip* appears while the *mouse* is over a control.
- (7) *ShortcutKeys* is a property which indicates whether a shortcut key is shown beside menu item text.
- (8) *SelectionMode* property indicates whether the *Listbox* can display *multiple* column, and *vertical* scrollbars are *eliminated* from the display.

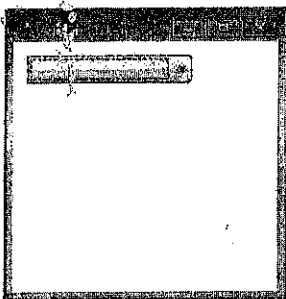
Question 2) Answer the following sub-questions as required at each of them: (16 Marks)

- (1) Write about *MDI* and some of its properties. Also, Write the code to add a new child form to a parent and show this child form.
- (2) Data binding used to display the data in *DataGridView* that can display data from a *data source* in tabular format. Write the basic steps which are performed.
- (3) Compare between "*CheckBoxes Control*" and "*RadioButtons Control*".
- (4) Let you have database called *DB_Books* created by using *SQL Server*. *DB_Books* contains Table called *Book_info* have some Fields as (*Book_id:(primary key)*, *Book_name*, and *Author*).
 - After dragging *dataGridView* control into a *Form* in *Visual C#*, Write the code by *C#* which used to connect the form and its *dataGridView* with the *DB_Books* database and to display the data of *Book_info* table in *dataGridView*. Notice: The code included using suitable *NameSpace* to *DB*.

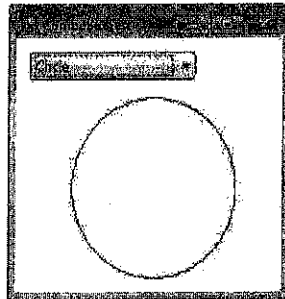
Question 3) (16 Marks)

- (1) Write *C# code* of the *Form (ComboBox Test)*, at choice *Circle* shape and *Filled Square* shape .

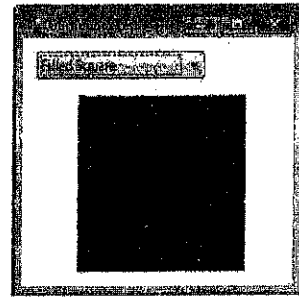
a) Initial GUI displayed when the app executes



b) GUI after selecting Circle from the ComboBox



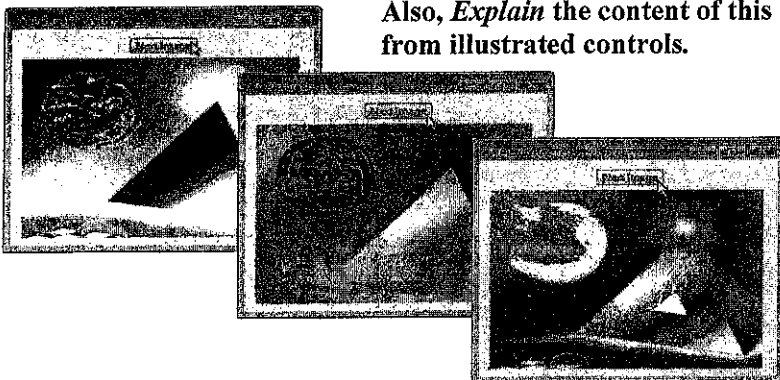
c) GUI after selecting Filled Square from the ComboBox



Also, Explain the content of this form and the steps to construct this form from illustrated controls.

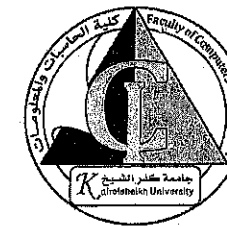
- (2) Write *C# Code* of the *Click* event for the "*NextImage*" *Button* to display *one image* from *sequence of three images* and *change to next image* at another click, etc.

Also, Explain the content of this form and the steps to construct this form from illustrated controls.



With best wishes with success;

Dr. Osama M. Abu Zaid



Answer the following Questions

Q1. Modeling the problem below and solve it graphically? (20 Marks)

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With my best wishes;

Dr. Haitham Samy Elwahsh