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Solution 1) Software engineering helps to reduce us programming time complexity.

Software Engineering use two important techniques to reduce problem Complexity:

1. Abstraction

2. Decomposition

The principle of abstraction implies that a problem can be simplified by omitting irrelevant details. The main purpose of abstraction is to Consider only those aspects of the problem that are relevant for certain purpose and suppress other aspects that are not relevant for the given purpose. Once the simpler problem is solved, then the omitted details can be taken into consideration to solve the next lower level abstraction and so on.

In decomposition, a complex problem is divided into several smaller problems and then the smaller problem are solved one by one. However, in this technique any random decomposition of a problem into smaller parts will not help. The problem has to be decomposed such that each component of the decomposed problem can be solved independently and then the solution of different components can be combined together to get full solution. A good decomposition of a problem should minimize interactions among various components.

### Examples:

#### \* Abstraction

- Coffee Machine, where all the functionality are hidden from the User.

#### \* Decomposition

- A book is divided into multiple chapters where each chapter has its own significance.

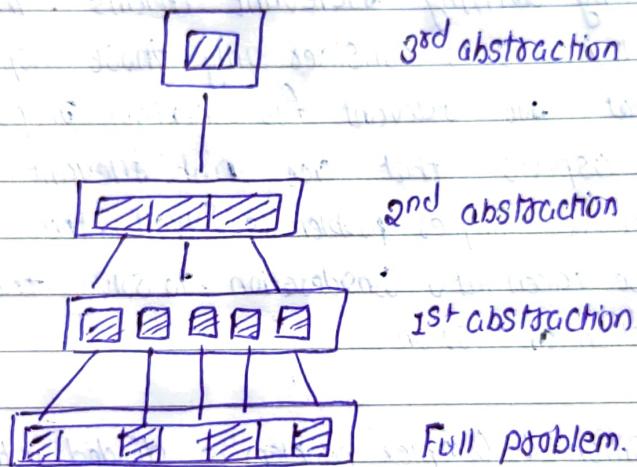


Figure : Showing hierarchy of abstraction

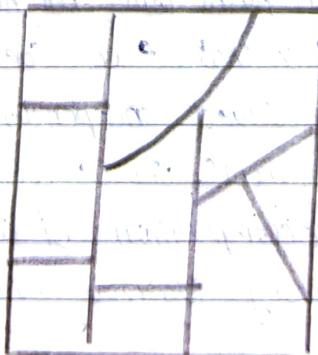


Figure showing Decomposition of a large problem into a set of smaller problems.

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Solution 2) b) The best life cycle model associated with above scenario is Agile model, it is because in agile model the requirement of product is broken down into multiple subtask are developed correspondingly and at last these subtask gathered together so that the entire product is developed. Now the point comes here is how to manage risk, in agile model as the requirements are broken into multiple task thus while developing each task is tested as unit test and after that entire product is tested as system test hence the risk of agile model is very less compare to other model but if any unidentified risk are identified then task associated with that risk are identified and solved independently so that risk of entire system is very less.

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### Solution 3) a)

The ADT for the question will be done by using python coding.  
please see below code for ADT to support all the features.

CLASS SETADT:

```
def new(self):  
    return set()
```

```
def add (self , inputSet, elementToBeadded ):  
    if elementToBeadded in inputSet:  
        return inputSet
```

```
def size (self, inputSet):  
    return len(inputSet)
```

```
def remove (self, inputSet, elementToBeRemoved ):  
    if elementToBeRemoved not in inputSet:  
        return 'Not in Set'  
    inputSet.remove (elementToBeRemoved)  
    return inputSet
```

```
def contain (self , inputSet , elementToBeChecked ):  
    if elementToBeChecked in inputSet:  
        return True  
    return False
```

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```
def equals(self, inputSet, otherSet):  
    if (len(otherSet) != len(inputSet)):  
        return False  
    for data in otherSet:  
        if (data in inputSet):  
            continue  
        else:  
            return False  
    return True
```

S = Set ADTC.

print(S.add({set([1, 2, 3]), 5}))

print(S.remove({set([1, 2, 3]), 2}))

print(S.size({set([1, 2, 3])}))

print(S.contains({set([1, 2, 3]), 1}))

print(S.equals({set([1, 2, 5])}, {set([1, 2, 5])}))

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Solution 3 > b> Given:

Equals (add (5, add (6, newc)), add (6, (add (5, newc))))

So in here by executing the given expression of;

Add (5, add (6, newc))

Hence we initiate a null set and add '6'

And then we add '5' to that set.

So, Set1 contains element (5,6)

now; from second expression; Similarly we get Set2 as (6,5)

So; from executing equals function; we have both the elements 5,6 in both the sets. So, we return True.

So, the ADT results in True.

Solution 4 > Q)

Condition #	1	2	3	4	5	6	7
Valid Card	N	Y	Y	Y	Y	Y	Y
First Pin Correct	N	N	Y	Y	Y	Y	Y
3-Correct PIN	N	Y	N	N	N	N	N
1-2 Wrong PIN	Y	N	N	N	N	N	N
Amounts Balance	N	N	N	Y	Y	N	N
Amount multiple of 100	N	N	N	Y	N	N	N

Action

Err Msg Card Reject	Y	N	N	N	N	N	N
Try Again	N	Y	Y	N	N	N	N
Card Seize	N	N	Y	N	N	N	N
Enter Amount	N	N	N	Y	N	N	N
Cash out	N	N	N	N	Y	N	N
Enter Amount Again	N	N	N	N	N	Y	N
Card Ejected	Y	N	Y	N	N	N	Y
Insufficient Fund	N	N	N	N	N	N	Y
Message							

Solution 5) c) Functional Requirements : Define what a product must do, what features and functionality it must provide.

Req 1: Choose clock.

Input: Enter a number in range 1 to 6 to select a numerical value to set a no hour/mins.

Output: If number entered is in range (1 to 6) display 'selected'.

else display 'try again'.

Req 2: Change City & Time Readings.

Req. 2.1 Input: Keyboard Input 'C' (for 'Configure')

Output: Display to change City & time.

Req 2.2: Input: Enter City name.

Output: City Name Changed.

Req 3: Toggle between 'analog' and digital clock.

Req 3.1: Input: Keyboard Input 'a'.

Output: Display Analog Clock.

Processing: Analog clock is be displayed at place of digital.

Req 3.2: Input: Keyboard input 'd'.

Output: Display digital clock.

Processing: Digital clock is displayed at place of analog.

Solution 5) a) Continue...

Non-Functional Requirements:

N.1: Clock Design: The clock should be designed automatically

N.2: Web-Support: A web-version should be developed that can be downloaded on a browser as an applet and

N.3: The clock should use only the idle cycles on the computer it runs.

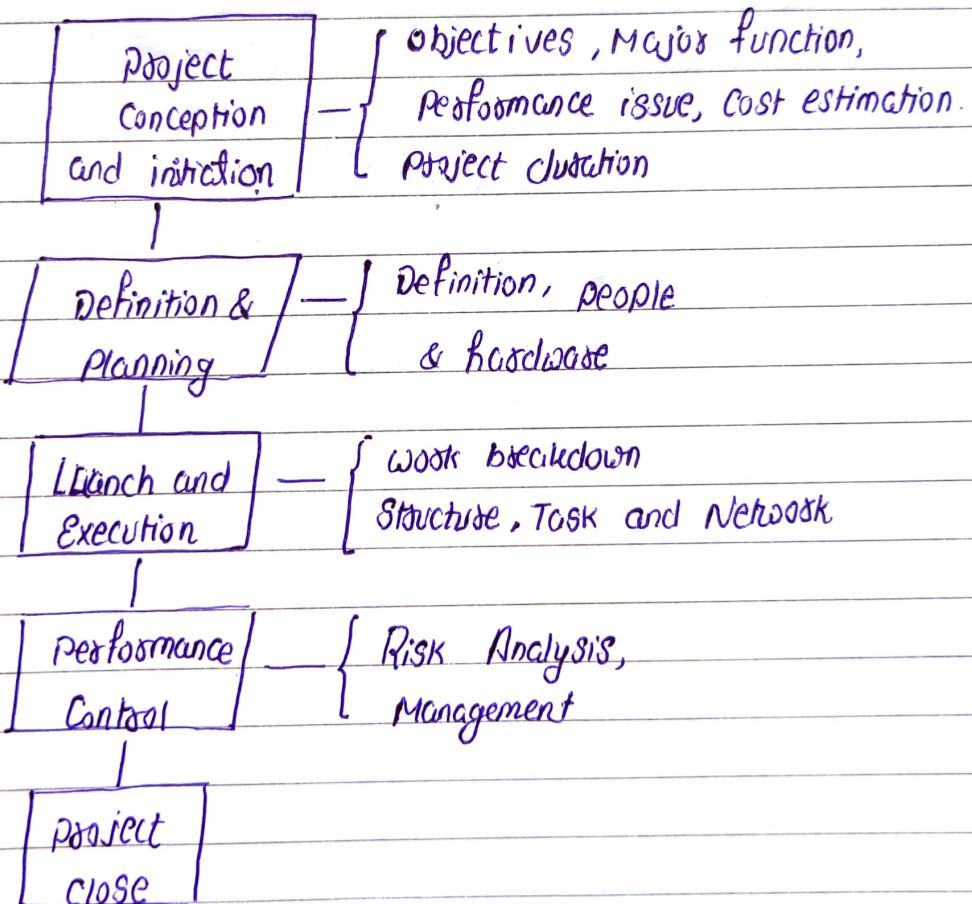
Solution 5 > b)

## The broad responsibilities of project management

### 1. Project planning.

→ project planning and control.

### The flowchart for project management.



Some Short Comings while estimating Cost of a product

- It is difficult to initialise the real size of product.

Solution 5>b> Continue...

2. Hard to accurately estimate the efforts of an individual and of a Team.
3. Difficult to estimate duration.

One can make an estimation based on experience of previous projects but still it can not accurately predict for a completely new project.

## Solution 2:-

While articulating the project objectives i will follow the SMART rule:

**Specific** - get into details . Objectives should be specific and written in clear, concise and understandable format.

**Measurable** - use quantitative language . You need to know when you have successfully completed the task.

**Acceptable** - agreed with stakeholders.

**Time-based** - deadlines not durations.

**Realistic** - in terms of achievements.

The basic process of project planning i will follow for diving the activities are:-

1. Scope planning.

2. Preparation of work breakdown structure.

3. Project schedule development.

4. Resource planning

5. Budget planning

6. Procurement planning.

7. Risk management.

8. Quality planning.

9. Communication Planning.

As we see in table "zombie library" takes the most time so it can be delayed till last as it has 15 days.

Texture editor can also be delayed i.e. 10 days.

A → Time 8

Depends ---

B → Time 5

Depends C

C → Time 10

D → Time 6

Depends A, G, I

E → Time 7

Depends A, G, I

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F → Time 7

G → Time 6

H → Time 3

I → Time 3

Depends H

- A, C, F, G, H are independent so just they can be started independently
- Then at end when each finishes we can start working on other dependents