Sessional Assignment

Software Verification and validation

Marks: **20**

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- What is Z specification, why it is used for, also give Example.

Ans: **Z SPECIFICATION:**

It is a model based sequential approach used for describing and modelling computing systems.
Z is not a programming language and does not compile into executable code, and also does not run interpreter.

USES:

- The purpose of Z is to describe the behaviour of a system such as software application in the language of modern mathematics.
- It is targeted at the clear **specification** of computer programs and computer-based systems in general.

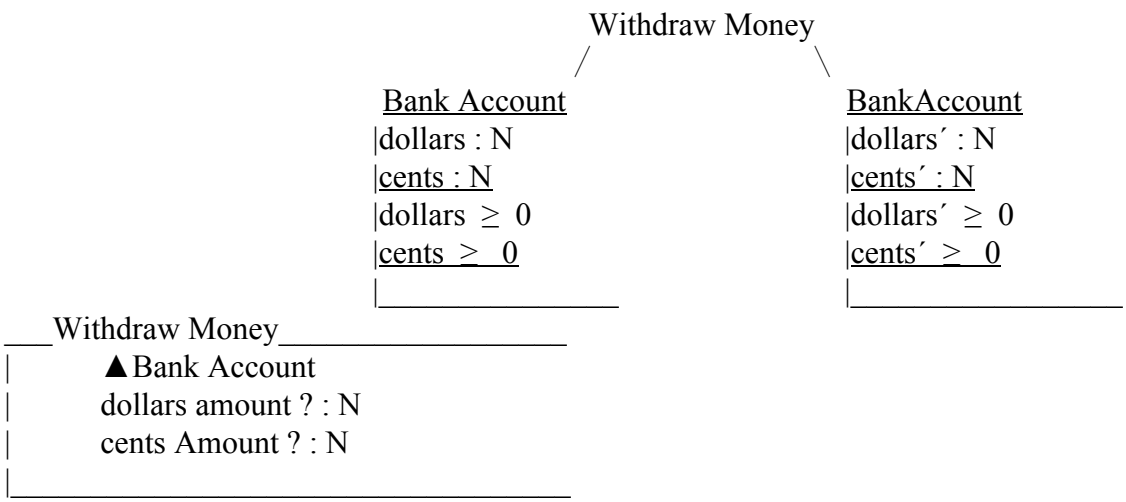
WHY "Z":

- Expressive power.
- Precise Formalism.
- Can be used to model a broad range of systems.
- Accuracy is important for safety-critical systems.

Although UML and data-flow diagrams are useful in modeling system behaviour, there are limitations in the amount of detail that they can describe given the **expressive power** of modern mathematics. It is natural to adapt mathematics to the description of computer systems and the use of mathematics to describe computer systems also lends itself to **precise formalism** this allows a clear unambiguous specification of the requirements of software useful in large software development teams the expressive power of Z also allow one to model not just computer system but system of almost any kind in particular the accuracy and expressive power of Z make it useful for the description of safety critical system such as banking systems and medical equipments.

EXAMPLE:

"BANKING SYSTEM"



dollar Amount ? ≤ dollars
dollar Amount ? = dollars => cent amount ? ≤ cents
cent amount ? > cents

=> (dollars´ = dollars´ - dollar amount ? = 1
^ cents´ = cents - cent amount ? + 100)
cent amount ? ≤ cents

=> (dollars´ = dollars - dollar amount ?
^ cents´ = cents - cent amount)