



## Assignment # 02: Software verification and Validation

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### Software verification and validation

Q:-What is Z specification, why it is use for, also give Example?

Ans:- **Z specification**:- “Describe the behavior of system in the language o f modern mathematics”.

the Z specification used for describing and modeling computer systems. It is targeted at the clear specification of computer program and computer based systems in general.

Z contains a standardized catalogue (called the *mathematical toolkit*) of commonly used mathematical functions and predicates, defined using Z itself.

Although Z notation (just like the APL language, long before it) uses many non-ASCII symbols, the specification includes suggestions for rendering the Z notation symbols in ASCII and in LaTeX. There are also Unicode encodings for all standard Z symbols.

→**WHY Z specification**:-

Following are the main reason why we used Z specification:

>expressive power.

>precise formalism.

>can be used to model a broad range of system.

>Accuracy important for safety-critical systems.

→Example:-

**Banking system:**

WithdrawMoney

BankAccount----->BankAccount'

Dollars : N

Dollars' : N

Cent: N

Cent' : N

Dollars  $\geq 0$

Dollars'  $\geq 0$

Cent  $\geq 0$

Cent'  $\geq 0$

$\Delta$ BankAccount

Dollaramount? : N

centAmount? : N

dollarAmount?  $\leq$  dollars

DollarAmount? = dollar  $\implies$  centAmount?  $\leq$  cents

centAmount?  $>$  cents

$\Leftrightarrow$  ( dollars' = dollars - dollarAmount? - 1  
^ cents' = cents - centAmount? + 100)

centAmount?  $\leq$  cents

$\implies$ ( dollars' = dollars - dollarAmount?

^ cents' = cents - centAmount? )