Assignment # 01

- Subject : Software Verification and Validation
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- **What is Z specification, why is it use for, also give example?**

Ans: Introduction :

Z is a formal specification language for computer systems which is based on set theory and predicate logic. There are several textbooks on Z in the library, in particular: • The Mathematics of Software Construction. A. Norcliffe & G. Slater. Ellis Horwood, 1991. • Z User Manual. M.A. McMorran & J.E. Nicholls. IBM Technical Report, 1989. • The Z Notation - A Reference Manual. J.M. Spivey. Prentice–Hall, 1989. • An Introduction to Formal Specification and Z. B. Potter, J. Sinclair & D. Till. Prentice–Hall, 1996. The basic until of specification in Z is a schema. A Z schema consists of a name, a declaration of variables and a predicate.

: SchemaName x : X

Predicate

Here, variable x is declared to be of type X (see section 2.2). Note that the declaration part may declare more than one variable. The predicate part is a predicate (see section 2.3) whose free variables are those of the declaration plus any constants.
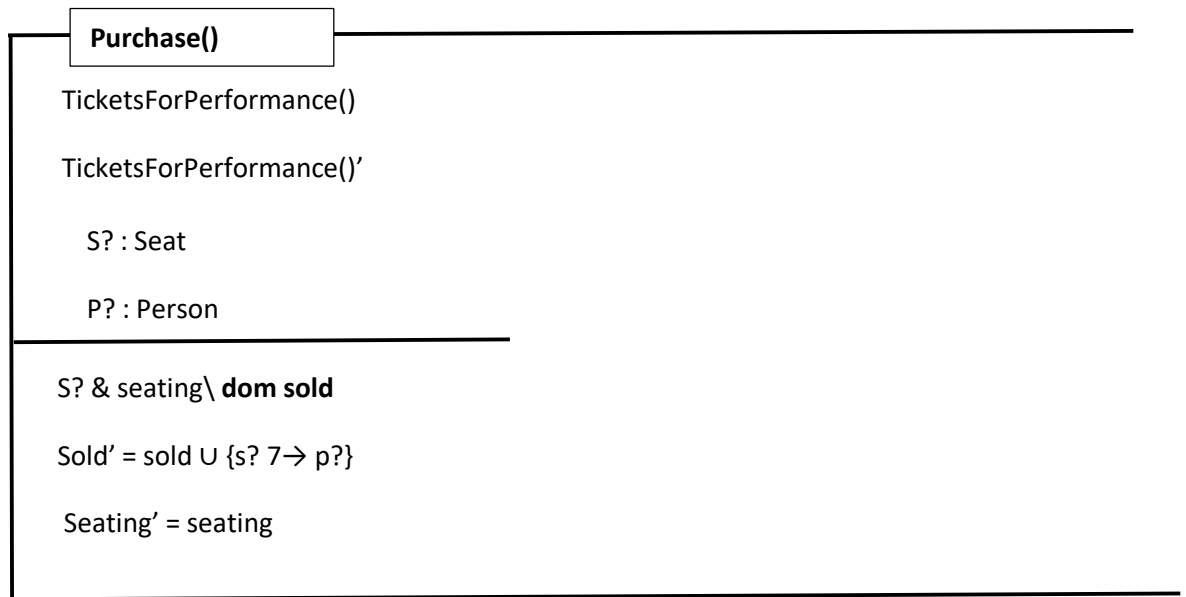
- **Why it is use for:**
  The **Z notation** /ˈzɛd/ is a formal specification language used for describing and modelling computing

systems. It is targeted at the clear specification
of computer programs and computer-based systems in
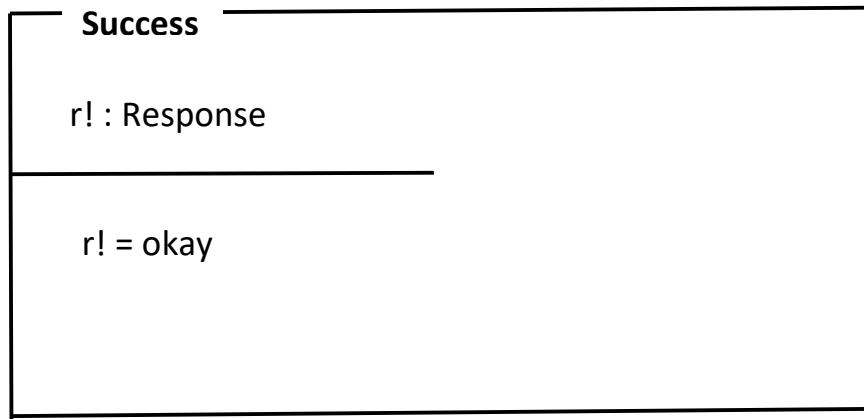general.

- **Example: 1**

  Theater: Selling tickets

  ___

  Purchase()

  TicketsForPerformance()

  TicketsForPerformance()'

  S? : Seat

  P? : Person

  ___

  S? & seating\ **dom sold**

  Sold' = sold ∪ {s? 7→ p?}

  Seating' = seating

  ___

(no output variables in this schema)

- **Example: 2**

  Response ::= okay | sorry

  ┌─ **Success** ─────────────────
  │
  │   r! : Response
  │ ─────────────────────
  │
  │   r! = okay
  │
  └─────────────────────────

Then

  Purchase0 ∧ Success

is a schema that reports successful ticket sale

⭐ **THE END** ⭐