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# Assignment #2.

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## Que 1

:. Hoare's logic.

Hoare' Triple.

i) setdetail() [{P} S {Q}]

| {P} | S | {Q} |
|---|---|---|
| {Student Name, student Age, student grade are initialized} | setdetails(studentname, studentage, studentgrade) | {Name=Student Name, Age=Student age, Grade=Student grade} |

getDetails()

| {P} | S | {Q} |
|---|---|---|
| {name, age grades Initilized} | getdetails() | {Return Name : name Age : age Grade : grade.} |

isPassed()

| {P} | S | {Q} |
|---|---|---|
| {Grade initialized} | isPassed() | {Return (Grade >= 60)} |

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main():

i) student student1:
{True} student1 { student1 object created };

ii) student1.setdetails()

{"Alice", 20, 75.5} student1.getdetails {Alice, 20, 75.5} . {name = 'Alice' age = 20 grade = 75.5}

iii) student1.getdetails()

{Name, age grades} get details() { Return Name: 'Alice' Age = 20 grade = 75.5 }

v) isPassed():

{grade initialized} {

(b)

setvalues();
{a, b are valid} set values(a, b) { num1 = a num2 = b }

⇒ function
{num1, num2 initialized} value Passed { {output Result}

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case '+':

{num1, num2 initialized} Result = num1 + num2 {outputs result}

case '-':

{num1, num2 Initialized} Result = num1 - num2 {output Result}

case '*':

{num1, num2 Initialized} Result = num1 x num2 {Result}

case '/';

{num1, num2 initialized} Result = num1 / num2 {output}

case default:

{num1, num2 Invalid} default {Invalid operation}

main ();

calc.set values

{a & b valid} calc.set value(a,b) {num1 = a, num2 = b}

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# Que 2 Z-schema.

∴ Library Management System

## Library

Books : ℙ Bookname
PersonID : ℙ PID
PersonName : ℙ Personname
Borrowed : Bookname, PID, Issue, Return ⇸ PID

Books = dom Borrowed.

## Borrow Book

ΔLibrary

Bookname? : Bname
Personname? : Pname
PersonID? : PId
IssueDate? : Idate
ReturnDate? : Rdate

(PersonID?, Bookname?) ∉ Borrowed ∧ Bookname? ∈ Books

Borrowed' = Borrowed ∪ {(PID?, Bookname?) ↦ (PName, Issuedate, ReturnDate?)}

Books' = Books \ {(Bookname?)}

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## Show Book

Ξ Library

PID? : Person_ID

Bookname? : Bname.

PID? ∈ dom Borrowed ∧ Bookname? ∈ dom Borrowed

Books! = Books \ {(PID? ↦ Bookname?)}

## Return Book

Δ Library

PersonID? : PID

Bookname? : Bname

currentdate? : Date.

(PersonID ∧ Bookname) ∈ Borrowed ∧ (returndate ≤ current date?

Borrowed' = Borrowed \ {(PID? ↦ Bookname)}

Books' = Books ∪ {(Bookname?)}