# Student Module Interface

## Uses

Course

## Syntax

### Exported Constants

None.

### Exported Types/Types

None.

### Exported Access Routine

| Routine Name | In | Out | Exceptions |
|---|---|---|---|
| new Student | String | Student | None |
| getName | | String | None |
| addDesiredCourse | Course | | None |
| getBestSchedule | | Course{} | None |

## Semantic

### State Variables

name: String
desiredCourses: Course{}

### State Invariant

State invariants (or class invariants) is a condition which is true before and after every access routine call. These must be enforced in the implementation in addition to the specification. See below.

### Assumptions

- The notation $\mathcal{P}$(S) refers to the powerset of S
- All day inputs are within the range 1 to 5 inclusive
- All hour inputs are within the range 8 to 17 inclusive
- There exists at least one valid schedule when getBestSchedule() is called

**Access Routine Semantics**

new Student(name):

- transition: this.name = name
- output: out := this

getName():

- output: out := name

addDesiredCourse(c):

- transition: desiredCourses := desiredCourses ∪ {c}

getBestSchedule()

- output: out:= s where
  $s \in \mathcal{P}(desiredCourses) \wedge \forall(s' : Course\{\} | s' \in \mathcal{P}(desiredCourses) : daysOnCampus(s) \leq daysOnCampus(s'))$ ∧ isValidSchedule(s)

**Local Functions**

isValidSchedule: Course{} → $\mathbb{B}$
isValidSchedule($S$) = $\forall(course : S | course \in desiredCourses \wedge |S| = 5) \wedge$
$\forall(c1 : S | \forall(c2 : S | !c2.conflictsWith(c1))$

daysOnCampus: Course{} → $\mathbb{N}$
daysOnCampus(s) = $|\cup(d : \mathbb{N} | 1 \leq d \leq 5 \wedge \exists(c \in S : c.hasLectureOn(d)) : d)|$

**Local Variables**

None.

**Considerations**

None.

Please see next page

## A2 Question

Depending on the needs of the client, it might not be necessary to return a list at all. When calling the getBestSchedule() method, it might simply be preferable to display the best schedule by printing it to the screen. Any manipulation of the schedule should happen within the student class.