

**SEN-101 Algorithmic Thinking & Problem Solving**  
**Lab 4: Practice Assignment**  
**Defensive Algorithmic Thinking**

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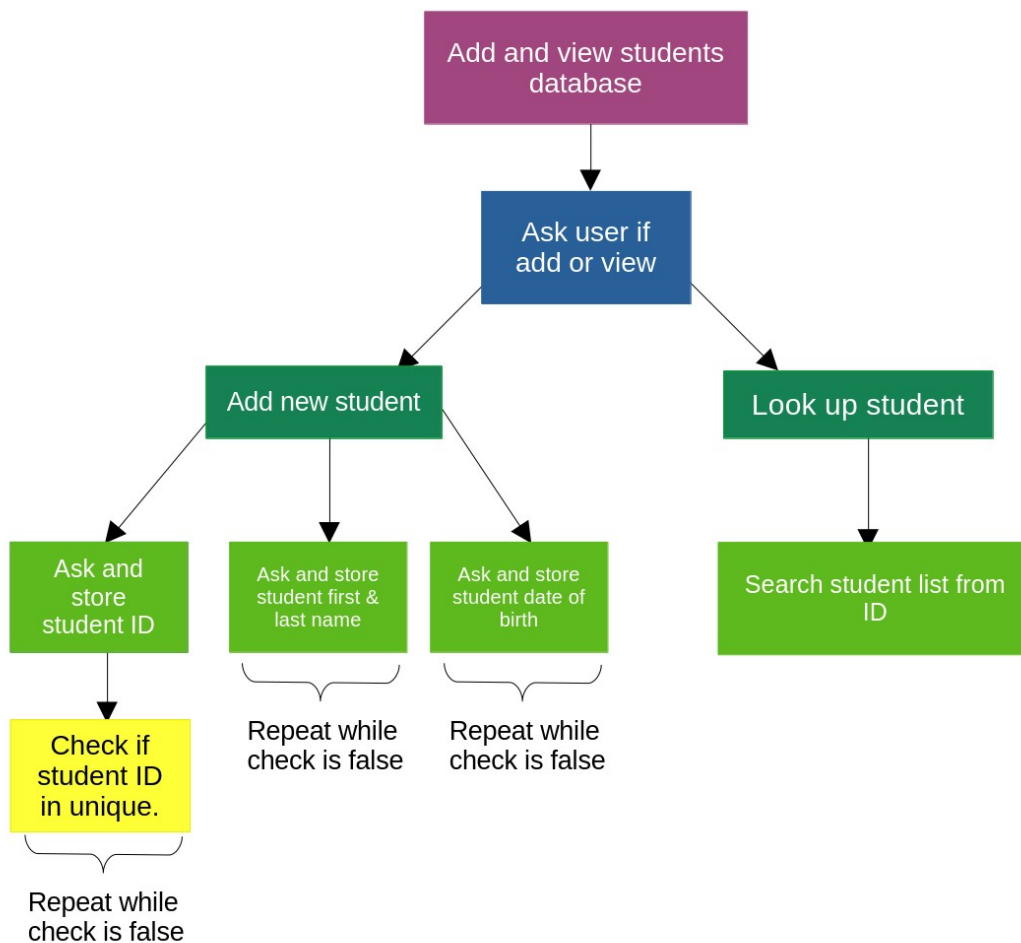
**Error conditions**

1. If no input was entered when asked
2. Student ID is not 8 digits long
3. Incorrect dates

**Boundary Conditions**

1. User entered zero students
2. User entered 200 students

**Successive Refinement Diagram**



## Top-Level Pseudocode

```
set num_of_students = 0
repeat
    print options
    ask for option
    if option is 1
        do Add student to list          (see below)
    else if num is 2
        do Search for student in list   (see page 4)
    else if num is 0
        exit
    else
        print error message "Invalid option number"
    endif
endrepeat
```

## Add student to list

```
if num_students is 200
    print "Sorry, this program only handles up to 200 students"
    return to Top-Level Pseudocode
endif
do Get and store student ID           (see below)
do Get and store student name         (see page 3)
do Get and store student birth date   (see page 3)
add 1 to num_students
return to Top-Level Pseudocode
```

## Get and store Student ID

```
set check to false
repeat while check is false
    set check to true
    if length of student ID is not 8
        print error "ID must be 8 digits"
        set check to false
    else if input is not a number
        print error "Only accepting numbers"
        set check to false
    else if student ID is not unique   (see page 3)
        print error "must be unique"
        set check to false
    endif
endrepeat
```

## Get and store student name

```
set check to false
repeat while check is false
  set check to true
  get first and last name
  if no input
    print error message "Please enter first and last name"
    set check to false
  else if two strings no separated by space
    print error "Please enter both first and last name"
    set check to false
  else if first or last names have special characters
    print error "Do not use special characters"
    set check to false
  endif
endrepeat
```

## Get and store student birth date

```
set check to false
repeat while check is false
  set check to true
  get student birth date
  if length of student birth date is not 10
    print error "Please enter date as dd/mm/yyyy"
    set check to false
  else
    separate day, month and year as integers
    if year is less than 1990 or more than 2010
      print error "Invalid year, please enter between 1990 and 2010"
      set check to false
    else if month is not between 1 and 12
      print error "Invalid month, please enter between 1 and 12"
      set check to false
    else if day is less than 1 or more than max number of days in month
      print error "Invalid day"
      set check to false
    endif
  endif
endrepeat
```

## Check if ID is unique

```
repeat while students are left in list
  if new ID is the same as this student ID
    return false
  endif
endrepeat
return true
```

## Search for student in list

```
if num_of_students is 0
    print "No students entered."
else
    repeat while there are students in list
        if input ID is the same as this student ID
            print name and birth date for matching student
            return true
        endif
    endrepeat

print "Cannot find student with the ID: `input`"
return false
```