Programming Fundamentals I – Final Project

Analysis

When the program is first run you have to input how many rows the plane will have and how much the one-way ticket will cost.
Only integer rows will be accepted and for the cost all numbers will be accepted for the value, if a negative value is typed, the number assigned will be the absolute value of the number.

After both values are inputted correctly a menu will be printed to the screen, with four options:

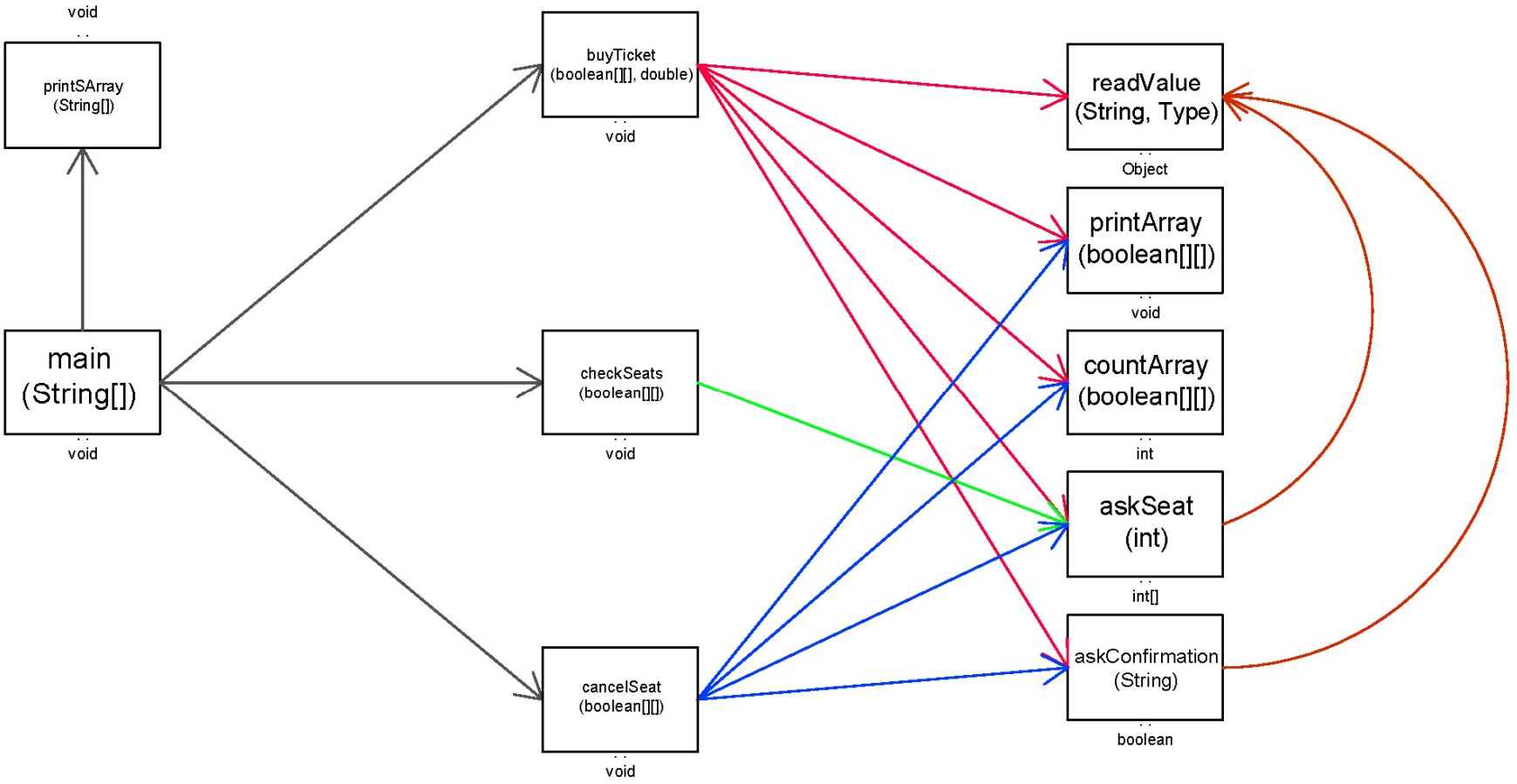
1. Buy Tickets.
2. Check Tickets.
3. Cancel Tickets.
4. Exit the program.

In order to select one of the four options introduce the corresponding numbers assigned to them, any input below 1 or above 4 will have no effect in the program and another value will be asked.

- If number 1 is selected the number of tickets will be asked greater than the number of seats available.
    - After this value is entered correctly the desired seat will be asked in the plane, how the value is entered doesn't matter while the order of the digits are not changed.
      The allowed range will be specified in the program.
      Then, you will be asked if you want a return ticket and if any luggage will be carried luggage, simply input "yes" or "y" to confirm, or anything else to reject.
        - If luggage is carried you will be asked for how many luggage you will carry, only integer numbers will be accepted and if a negative value is typed its absolute value will be used.
    - This process will be repeated until all the tickets specified are bought, when this process ends the price will be printed and you will be returned to the menu.
- If number 2 is selected a seat to be checked will be asked, the range accepted will be printed in the screen, the status of the seat will be then printed.
- If number 3 is selected the seat to be cancelled will be asked, the range allowed will be shown in the screen, after entering the seat desired you have to confirm you want to cancel that seat, type "yes" or "y" if you really want to cancel it, anything else to not cancel it.
- If number 4 is typed a confirmation will be done in order to exit the program, type "yes" or "y" to exit the program, anything else to not exit the program.

Design

Structure diagram



Pseudocode

There's a copy of the pseudocode in the .zip file.

```
Begin main()
      numberOfRows <- readValue("How many rows are there in the
plane?", Whole_Number)
      priceOfTicket <- readValue("How much does the one-way
ticket costs?", Real_Number)
      stop <- false
      seats <- null
      Do
            printSArray(("What do you want to do?", "1: Buy
tickets", "2: Check", 3: Cancel tickets", "4: Exit the
program"))
            action <- readValue("", Whole_Number)
            Switch (action)
                  value 1:
                        seats <- buyTicket(seats, priceOfTicket)
                  value 2:

                  value 3:
                        seats <- cancelSeat(seats)
                  value 4:
                        If(askConfirmation("Are you sure you want
to exit the program?") = true) Then
                              stop <- true
                        End_If
            End_Switch
      While (NOT stop)
End main()

Begin printArray(inSeats)
      Write("This is the layout of the plane." & "\n")
      For (i <- 0) while (i < inSeats.dimension0)
            For (j <- 0) while (j < inSeats.dimension1)
                  If inSeats(i)(j) = true Then
                        Write ("X")
                  Else
                        foo <- IntegerToChar(j+65)
                        Write (i+1 & foo & " ")
                  End_If
                  j <- j + 1
            End_For
            Write NewLine
            i <- i + 1
      End_For
      Write NewLine
End_printArray

Begin askSeat(inNumberOfRows)
      error <- false
      row <- 0
      column <- 0
```

```
      Do
            digits <- ""
            letters <- ""
            seat <- ToUpperCase(readValue("Insert the number of
the seat (1 - " & inNumberOfRows & ") (A - D):", Sentence))
            cseat <- ToCharacterArray(seat)
            For i <- 0 while i < Length(cseat)
                  If (cseat(i) > 47) AND (cseat(i) < 58) Then
                        digits <- digits & cseat(i)
                        error <- false
                  Else
                        If (cseat(i) > 65) AND (cseat(i) < 69)
                              letters <- letters &
toString(cseat(i))
                              error <- false
                        Else
                              error <- true
                              EXIT_IF
                        End_If
                  End_If

                  If error = true
                        Write ("The seat entered is not valid")
                  Else
                        row <- ToWholeNumber(digits) - 1
                        column <-
ToASCII(CharacterPosition(0)InSentence(letters) - 65)
                  i <- i + 1
      While (error = true)
      return (row,column)
End_askSeat

Begin cancelSeat(inSeats)
      If countArray(inSeats, true) = 0 Then
            Write ("All the seats are empty")
      Else
            printArray (inSeats)
            Write ("Which seat do you want to cancel?" & NEWLINE)
            seat = askSeat(Length(inSeats))
            If NOT (inSeats(seat(0), seat(1))) = true Then
                  Write("Error, that seat is empty.")
            Else
                  If askConfirmation("Are you sure you want to
cancel that seat?") = true Then
                        inSeats(seat(0), seat(1)) = false;
                        Write ("Seat cancelled succesfully")
                  End_If
            End_If
      End_If
      cancelSeat <- inSeats
End_cancelSeat

Begin buyTicket(inSeats, inPriceOfTicket)
```

```
      If countArray(inSeats, false) = 0 Then
            Write ("All the seats are busy.")
      Else
            finalPrice <- 0
            tickets <- 0
            numberOfSeats <- countArray(inSeats,false)
            Do
                  tickets <- readValue("How many tickets do you
want to buy?", Whole_Number)
                  If (tickets > 10) OR (tickets < 0) OR (tickets
> numberOfSeats) Then
                        Write ("The number of tickets entered is
not valid.")
                  Else
                        If tickets > 5 Then
                              discount <- true
                        Else
                              discount <- false
                              count <- tickets
                              While (count > 0)
                                    Write ("Ticket " & (tickets -
count + 1)
                                    printArray (inSeats)
                                    seat <-
askSeat(Length(inSeats))
                                    If inSeats(seat(0), seat(1))
= true Then
                                          Write ("Sorry, that
seat is already bought.")
                                    Else
                                          If askConfirmation("Do
you want to buy a return ticket?") = true Then
                                                price <-
inPriceOfTicket * 1.5
                                          Else
                                                price <-
inPriceOfTicket
                                          End_If
                                    End_If
                                    If askConfirmation("Will you
carry any luggage?") = true Then
                                          luggage <-
readValue("How many will you carry?", Whole_Number)
                                    End_If
                                    finalPrice <- finalPrice +
price + luggage * 15
                                    inSeats(seat(0), seat(1)) =
true
                                    count <- count - 1

                        End_While
                  End_If
```

```
            While ((tickets > 10) OR (tickets < 0) OR (tickets >
numberOfSeats))
      End_If
      buyTicket <- inSeats
End_buyTicket

Begin checkSeats(inSeats)
      foo = askSeat(Length(inSeats)
      If inSeats(foo(0) foo(1)) = true
            Write ("That seat is busy")
      Else
            Write ("That seat is empty")
      End_If
End_checkSeats

Begin printSArray(text)
      For i <- 0 while i < Length(text)
            Write text(i)
            i <- i + 1
      End_For
End_printSArray

Begin askConfirmation(prompt)
      confirmation <- ToLowerCase(readValue(prompt, Sentence))
      If (confirmation) = "yes" OR (confirmation) = "y" Then
            return true
      Else
            return false
      End_If
End_askConfirmation

Begin countArray(inSeats, flag)
      For i <- 0 while i < dimension0(inSeats)
            For j <- 0 while j < dimension1(inSeats)
                  If inSeats(i, j) = flag Then
                        count <- count + 10
                  End_If
                  j <- j + 10
            End_For
            i <- i + 1
      End_For
End_countArray
Begin readValue(prompt, type)
      Write prompt
      Switch type
            value Whole_Number:
                  result <- readWhole
            value Real_Number:
                  result <- readReal
            value Sentence:
                  result <- readSentence
      End_Switch
End_readValue
```

User manual

To run the program you have to go the command prompt, press `Windows+R`, then type **"`cmd`"** and press `Enter`.
Navigate to where the `.java` file is located using the **"`cd`"** command followed by the route of the file.
After navigating to the file type **"`javac`"** followed by a blank space and the name of the file with its extension.
Afterwards, type **"`java`"** followed by a blank space and the name of the file, this time without the extension, when you press enter the program will start to run.

Córdoba Romero, Javier
García Castellanos, Javier