ITECH5403 - Comparative Programming Languages

Assignment 2 – Parallel Implementations

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Date Submitted: 04 October 2019

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# Introduction

In this assignment, we were tasked to create an application, the Hotel Room Bookings, in the three different programming language.

1. Java
2. Python
3. Lisp

I started coding first in the Python programming language, as this was the most familiar language I know, and it is still fresh in my knowledge as we used this programming language in the first semester. It took me three days to implement the Python program, as I am taking my time understanding and learning the specifications, and, I have encountered errors for implementing data storage and access, such as the booked date that I cannot store and access correctly, which I eventually fixed. I used arrays in my booked date functionality.

For the Java programming language, it was much easier because I already have the Python program working and most of the menus, prompts and displays were reused. I also encountered the error on implementing data storage and access for the booked date, in which I also cannot store and access correctly, but logically it was fixed. I used array lists in my booked date functionality.

As for the Lisp programming language, I found it hard to code and to implement the Hotel Room Bookings application. There are very limited online tutorials, physical books, online books, youtube videos and online resources. It was hard to understand, learn, implement and apply. I have only created the different menus and the exit function for this language.

In this paper, I will compare the three programming languages mentioned above, for their available features, usefulness, issues and robustness, and complications due to complexity or lack of features.

# Language features, issues, and robustness

# Switch statement

The useful feature I found in Java is the availability of the switch statement for the programmers. In Python, it uses a series of if and else statement to implement the selection of one of many code blocks to be executed. To further illustrate, see a sample code snippet I implemented in this program application.

**Java:**

switch (month) {

case 1:

return day;

case 2:

return 31 + day;

case 3:

return 59 + day;

**Python:**

if (month == 1):

return day

elif (month == 2):

return 31 + day

elif (month == 3):

return 59 + day

# String functions

One useful feature I found in Python is the availability of built-in string functionalities such as the isalpha which is used to check if the string is alphabetic or not. Useful in input checking and validation if we only need numbers such as checked-in and checked-out dates. It is not available in Java. See sample code snippet.

**Java:**

if (booking\_checkin\_month >= 1 && booking\_checkin\_month <= 12 )

**Python:**

if (booking\_checkin\_month.isalpha() == True or int(booking\_checkin\_month) < 1 or int(booking\_checkin\_month) > 12):

## 2.3 Data Type

Java and Python are both strongly typed languages. But I liked Python more because of the freedom it gives to the programmer to just code and not worry about the declaration of the data type. However, we must be cautious as inadvertent coding raises an error for a strongly typed language. See sample code snippet below.

**Java:**

boolean valid\_guest\_choice = false;

while (valid\_guest\_choice == false) {

**Python:**

valid\_room\_booking = False

while (valid\_room\_booking ==False ):

## 2.4 Abstraction

Java and Python are both object-oriented programming (OOP) languages, and the most important element in an OOP language is abstraction. I liked Java more because it allows me to express my code near the human language. For example, in my Java program, I created a class called Guest and created a Guest object. This is more meaningful, understandable, simple and readable to a non-programmer that will read my code. See sample code snippet below.

**Java:**

private static Guest findGuest(String guestId) {

Guest existingGuestRecord = guestLists.queryGuest(guestId);

while (valid\_guest\_choice == false) {

**Python:**

def find\_guest(expected, finder):

found\_guest = []

for guest in guests:

## 2.5 Parameter passing and returning

Java and Python can both have one or more argument passed. Python can have one or more returned parameters. But Java can only return one parameter. This restriction gave me difficulty in implementing the room capacity functionality in Java, as I am constrained only to return one parameter although Java supports returning an Object parameter. Python supported returning of multiple parameters, and for me it is easier to have control and access of the variables to pass and return, as little or as many as possible, which depends on the need of the program.

**Java:**

System.out.println("Please enter room number: ");

String booking\_room\_id = scanner.nextLine();

if (findRoom(booking\_room\_id) != null) {

Room bookingRoom = findRoom(booking\_room\_id);

int saved\_x = bookingRoom.getRoomCapacity();

**Python:**

booking\_room\_id = input("Please enter room number: ")

find\_by = 'room\_number'

looking\_for = booking\_room\_id

room\_found, z = find\_room(looking\_for, lambda x: x[find\_by])

# Logical operators

In Python, logical operators in words such as NOT, AND and OR are available to use. But in Java, these worded logical operators are not available, instead the symbolic logical operators are available in Java such as ! (not), && (and), and || (or). I find it simpler to use the worded logical operators as this is easier and simpler to write, understand and read. See sample code snippet.

**Java:**

if (booking\_checkin\_month >= 1 && booking\_checkin\_month <= 12 ){

valid\_booking\_checkin\_month = true;

**Python:**

if (booking\_checkin\_day.isalpha() == True or int(booking\_checkin\_day) < 1 or int(booking\_checkin\_day) > 31):

print ("Invalid day.")

# Loop statements

In Python, the FOR statement can be easily written in terms of a range. And in Java, it is more flexible as it supports a labelled for loop which can include the iterator. In this respect, I like the control and availability of the iterator variable in the Java language. See my sample code below.

**Java:**

for (int z = day\_number\_checkin; z < day\_number\_checkout+1; z++) {

if (buffer\_rooms[z] == false) {

buffer\_rooms[z] = true;

}

**Python:**

for y in range (day\_number\_checkin, day\_number\_checkout+1):

temp2\_rooms[y] = True

rooms[z-1].update(temp2\_rooms)

# Conclusion

Different programming language offers different features as well as different issues. Depending on the goals and needs of your application program, you can choose a suitable programming language that will cater and accommodate your program. This means that you must assess the advantage and disadvantage of one programming language from another one, as well as it’s issues and complexities. I have discussed in this paper some of the useful features, and the limitations of Java and Python which I personally encountered and experienced while developing the Hotel Room Bookings application program. I barely touched the Lisp programming language, just its menus, but I believe that Programmers nowadays will never choose Lisp as it is like a terminal, command-line, and Disk-Operating System (DOS) prompt language which is not a user-friendly programming language, and very little resources are available for this language.

In a wholistic view, after completing the programs, I will say that I like most the Java programming language compared to the other two languages, Python and Lisp. Although I am a beginner in Java language, I am on my way to successfully get a strong Java programming skill. This can be achieved with my continuous learning and engagement in lecture lessons and slides, laboratory resources and coding, physical and online books, online tutorials, and resources, youtube tutorial videos, coding practices at my laptop, at the laboratory computers and at the library computers aided with the creation of different program applications in the Java programming language.

# Reflection

Wrapping up the Comparative Programming Language with a parallel implementation of a text-based program for a Hotel Room Bookings application, was both a rewarding and disappointing task for me. Rewarding, because I was able to make the program work exceptionally both in Python and Java. But disappointing because I was able to come up only with the different menus and quit function for the LISP program. Big challenges were encountered during the coding part, especially for the room capacity functionality and the booking date functionality. At first in Python, I cannot access value of the room capacity. And after a lot of thinking and debugging, I came up with returning two parameters so that I can exactly know the index of the room capacity, thus I was able to access and control it. As for the booking date functionality, it took me also a lot of time thinking and debugging on how to set-up the 365 days in a year, access and update it so that I will know if the room is booked or vacant on a given day or a range of days. I used arrays on Python and array lists in Java to implement the booking date successfully.

I gave my best efforts for learning and understanding different programming language, especially recalling the Python program which I learned last semester and applying the Java program which I just learned this semester. It was a great experience for re-learning Python and learning the Java programming languages. My practical coding skills were applied and tested, and it culminated with a running and executing Hotel Room Bookings application program written both in Python and Java, and a little bit of LISP menus.