SCHOOL OF SCIENCE AND TECHNOLOGY

BSC (HONS) COMPUTER SCIENCE; YEAR 2

ACADEMIC SESSION July 2020; SEMESTER 6, 7, 8, 9

CSC2044: CONCURRENT PROGRAMMING **DEADLINE: 17 JULY 2020, 2PM**

STUDENT NAME: _____

STUDENT ID: _____

INSTRUCTIONS TO CANDIDATES

- This assignment will contribute 50% to your final grade.
- This is an individual assignment.

a) Airport Traffic Control (Maximum 35 marks)

You are required to write a concurrent program to control the air traffic in an international airport. In this airport, there are **THREE (3)** runways that allow aircraft to land and depart. The Following conditions have to be fulfilled:

i) Aircraft that is going to land or depart has to be generated randomly.
ii) Departing aircraft is not allowed to take off in less than **5 seconds**, but it can take longer duration if there is no other aircraft that is going to take off.
iii) Landing aircraft will take **10 seconds** to land, and no aircraft is allowed to take off by using the same runway during this period of time.

Each aircraft is represented by a thread and assigned with a different ID. You have to print out a statement when an aircraft is created, departed, or landed, along with the time stamp. In addition to this, you are required to print out a statement when the aircraft takes the runway as well. Furthermore, appropriate action should be taken into consideration to **prevent deadlock** and **starvation**.

Count the number of times that each runway is used for departing/landing and include it as part of your output to ensure all runways are used fairly.

Your code will be marked on correctness, design, clarity, efficiency, and appropriate comments within the program.

b) Report (15 marks)

Your report must include:

i) Description of how you implemented your solution.
ii) Description of how you tested your program, along with sample output from your program.
iii) Description of the actions taken to prevent deadlock and starvation.
iv) Elements of the assignment that you were not able to complete.
v) List and description of any bugs in your program.

Marks will be generously deducted for poorly written descriptions, poor spelling, and poor grammar.

c) Submission

Marks will be generously deducted for not following submission instructions:

1. Submit a single zip file via elearn. The name of the zip file must be your full name and ID, separated by an underscore "_":
   Ex) JimmyJohnCarter_13431432
2. Your zip file must include all of your .java files and your report file. Please do not submit your entire project from Eclipse/Netbeans.
3. Your zip file must also include one additional text file (.txt) that includes all of your source code. Include your main class first, and then include all of your other classes. The name of your file must be your full name and "all" separated by an underscore:
   Ex) JimmyJohnCarter_all.txt