

# Course Project Information

**Submission:** CPLEX file and brief write-up

## Requirements of the formulation

- **Implemented in CPLEX**
- **Makes use of binary variables and logical constraints**
- **Read .dat file**

## Requirements of the report

- **Written in Latex or Microsoft Word.**
  - Typesetting of equations is required! Use the Equation editor.
- **Explains necessary components of formulation as it related to the problem at hand**
- **Everything is mathematically correct, and where necessary expressed using correct mathematical notation**
- **Clearly explains each portion of the formulation**
  - **Relevant coefficients**
  - **Decision variables**
  - **Constraints**
  - **Cost function**
  - **(Other topics as needed)**
- **Presents the complete formulation**
- Write-up should probably be at a minimum **between 2-5 pages**. Really, you just need to **explain thought process.(Be Specific!!!)**

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Submission:

- **One pdf file of write-up**
- **One .mod file from CPLEX**

## Grading

- 30% Documentation
- 70% Correctness of implementation/modeling

I will run your mod file through a series of scenarios. If the solution is correct you will receive full credit on the modeling portion.

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## Test Scenarios

(TO BE PROVIDED)

The zip file(s) contains a set of dat files to test. The naming convention is as follow "testScenario\_N<#Aircraft>\_v<TestCaseForN>.dat". So for example, "testScenario\_N02\_v02.dat" is easy to solve because it has only N=2 aircraft. The numerically harder problems are like "testScenario\_N100\_v01.dat" which has N=100 aircraft.

Feel free to post your objective functions and optimal dv for the test cases to verify your work with others.

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Levels of Grading (of the 70% correctness)

- C : Hardcoding testScenario\_N05\_v01.dat
  - Must implement all elements of the formulation.
- B: Programming CPLEX to work with any size problem or DAT file
  - Missing some elements of the formulation
  - Incorrectly programming some of the logical
- A-/A : Programming CPLEX to work with any size problem or DAT file
  - Minor errors or missing minor components of the formulation
- A+: Programming CPLEX to work with any size problem or DAT file
  - No errors, perfect implementation

Important elements of the formulation (Check list)

- Define all decision variables
- Equations determining when aircraft lands or departs at airport.
- Equations to calculate distances traveled
- Constraints restricting maximum heading changes
- Constraints restricting turnbonging
- Separation constraints to ensure aircraft are safely separated. This is best done with logical constraints

You will require the use of forall and sum.