

# Railbot (4/4) Final Project

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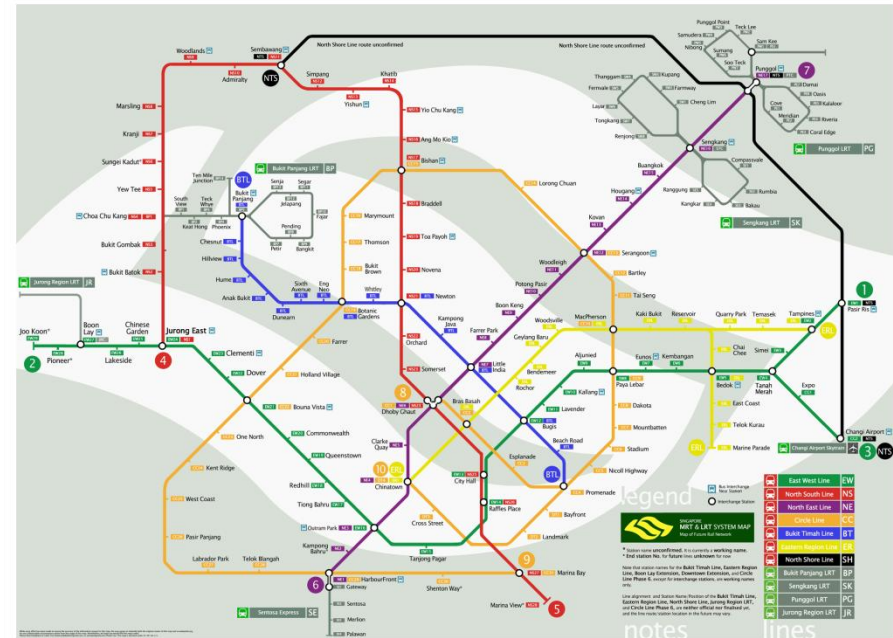
2009 Fall

# (I) System Design

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# Content

- Develop an ATC system which can be planned and implemented efficiently.
- This system has some predefined information, such as the traveling time, the type of trains and the prices of ticket.
- You should use them to plan your own strategy and also implement them.



# How to

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- Figure out your solution for this system.
- Implement an ATC system by using what you learn in this course.

# You have to Design

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- Ticket price
  - Different prices for each kind of train
- Types of trains
  - two fast, two slow, or one fast and one slow
- Stopping pattern
  - maximize the total revenue

# Characteristics of trains

	# of Stops	Possible Stopping Patterns	Capacity (Passengers / Train)	Average Speed (kph)
Type A Train (Fast)	2	One of the following Patterns : A-B, B-C, or C-A	700	60
Type B Train (Slow)	3	A-B-C	700	30

# Relationship between price and demand

## Demand

OD Pair	Type(A)	Type(B)
AB	$D = -6P + 240$	$D = -120P + 1200$
BC	$D = -4P + 120$	$D = -100P + 1000$
CA	$D = -5P + 200$	$D = -90P + 900$
AC	$D = -12P + 720$	$D = -15P + 300$
BA	$D = -10P + 600$	$D = -10P + 200$
CB	$D = -9P + 540$	$D = -12P + 240$

# Requirement and assumptions

- All trains should run in the counterclockwise direction
- Every station should be served by at least one train.
- Type A train can pass Type B train at any of the station if needed
- Ignore stopping time at station
- Ignore any cost with operation
- Price is independent to distance
- You can charge different price for different link with the same distance



## (II) System Implementation

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# System function requirement

- **Track and Train Design:**
  - Implement the mechanism of trains as Type A and Type B train. Also, the track for this scenario has to be implemented as well.
- **Block Signaling:**
  - The trains should able to be controlled by the mechanism of block signaling.
- **Passing:**
  - The train is capable of performing passing behaviors on the stations for achieving your strategy.
- **Extra Design:**
  - Every extra design regarding to railway control is welcome to implement in your system.

## (III) Grading

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# System function requirement

- **Demonstration (50%)**
  1. track and train design (20%)
  2. block signaling (10%)
  3. passing (20%)
  4. extra design(10%)
- **Report (50%)**
  1. railway strategy (10%)
  2. hardware design (20%)
  3. software design (20%)

# Question?

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Course website  
<http://robot2009.caece.net>