Design Project

Elevator Controller

CAN, Tasking, and Rhapsody
Controller for CAN Elevator
CAN ID & Data

- Rx message ID=1
- Moving up=01,01
- Moving down=01,02
- Stop moving=01,00
- Door open=02,01
- Door close=02,02
• Tx message ID=2
• When the car is moving, a CAN message with the current position in pixel is transmitted 5 times/sec.
• $1^{st}$ byte=$1, 2^{nd}$ byte=high byte of position, $3^{rd}$ byte=low byte of position
• Each floor height is 80 pixels
• At the first floor, position is 0. At the $5^{th}$ floor, position is 320.
CAN ID & Data

• Tx message ID=2
• When a call button is pressed, a CAN message is transmitted
• 1st byte=2, 2nd byte=floor, 3rd byte=1 for up & 2 for down. For example when the 4th floor up button is pressed, the data is 2,4,1
CAN ID & Data

• Rx message ID=1
• When a CAN message with 1\textsuperscript{st} byte=3 is received, a call button is off.
• 1\textsuperscript{st} byte=3, 2\textsuperscript{nd} byte=floor, 3\textsuperscript{rd} byte=1 for up button & 2 for down button. For example when a CAN message with the data 3,4,1 is received 4\textsuperscript{th} floor up button is off.
Design Problem

• Design an elevator controller.
• You have to set up your own design objectives to achieve. i.e. the level of complexity for the control algorithm.
• After the design, analyze your own design to determine if your design satisfies your own objectives.
Design Assumption

- To simplify the problem, the following is assumed: the car is waiting at the 1st floor. Everybody wants to go down to the 1st floor for lunch.
- Move up to the floor, turn off the call button lamp, open the door, closed the door, go down to the destination floor, open the door, close the door, etc.
Requirements for Design

• Reliability

• The controller must be able to respond to all the possible key inputs in the reliable and reasonable manner.
보고서 제출 요령

• 보고서와 함께 프로젝트 파일도 e-mail 로 제출 할 것
• 빈 directory를 만든 후,Rhapsody project가 열린 상태에서 File menu의 Save As를 이용하여 빈 directory에 저장한다.
• 프로젝트 파일이 저장된 directory를 zip file로 압축하여 limdj@hanyang.ac.kr로 제출
보고서 내용

- 본인이 설계하기로 설정한 제어기 동작 시나리오를 기술
- 본인이 설계한 제어기가 본인이 설정한 기준을 만족하는지 분석한 결과
- 본인이 설계한 제어기의 실제 동작 결과에 대한 기술
- 결과에 대한 결론 및 토의
평가

- 기능 구현: 40%
- 설계의 적절성 및 안전성: 30%
- 결과 보고서: 30%
- 본인이 설계하기로 설정한 시나리오의 완성도에 따라서 가점 또는 감점이 있을 수 있음.
ReceiveMessageObj

InitialState

MessageArrived

evMessageReceived

evMessageReceived
Motor

Wait \( \rightarrow \) \( \text{evCurrentPosition} \)

IsAtFloor \( \rightarrow \) \( \text{evCurrentPosition} \)
Caution

- When CAN messages are received while the program is not ready to accept messages, an error occurs. In that case, start over the program again.

- Be cautious when using `printf`, since it slows down the program and misses CAN messages.
CrossView Debugger
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