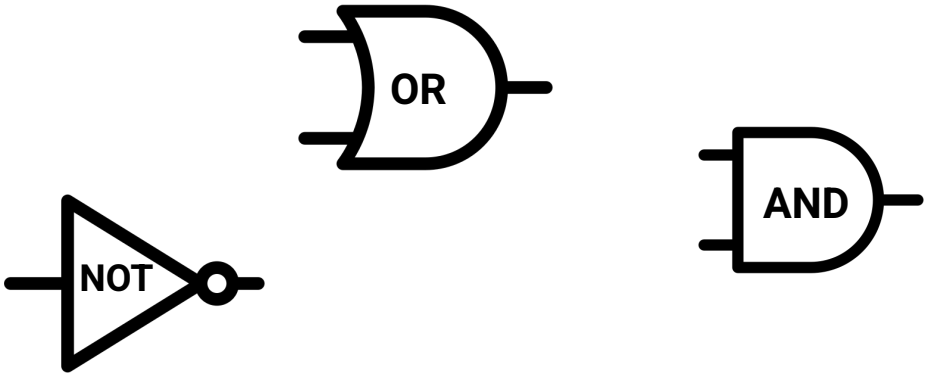
Logic equations, diagrams and truth tables for the 6 scenarios

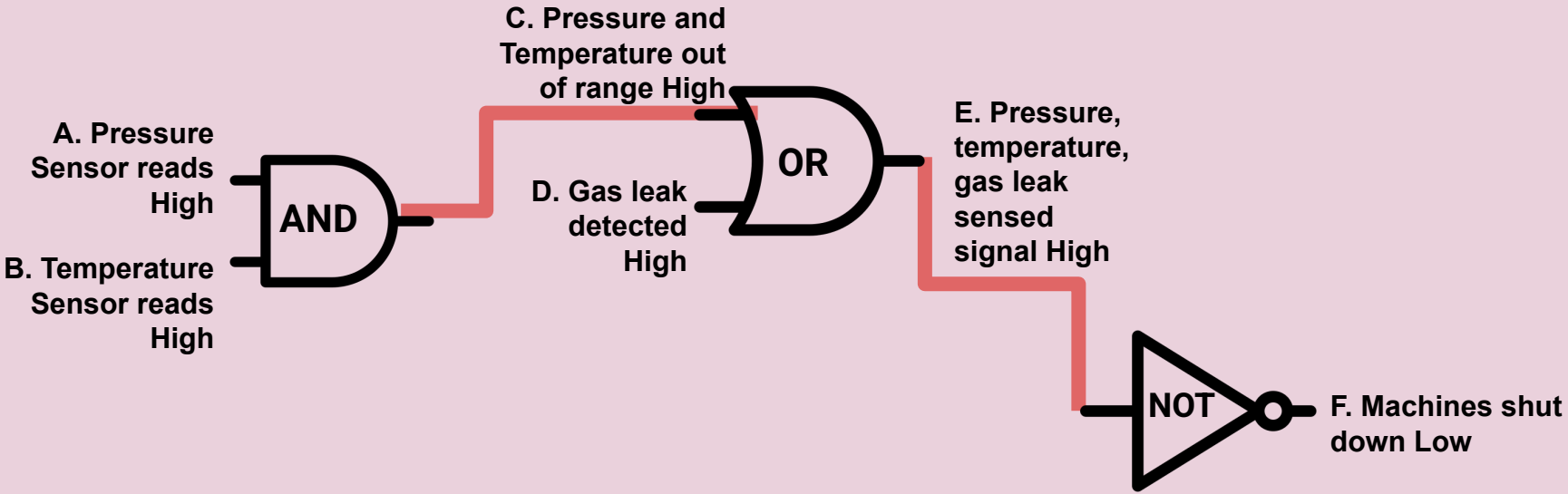
RET 25-Beyond Binary

AND OR NOT Symbols for use in diagrams

Paste symbols here



Chemical Manufacturing Safety System-Integration Diagram



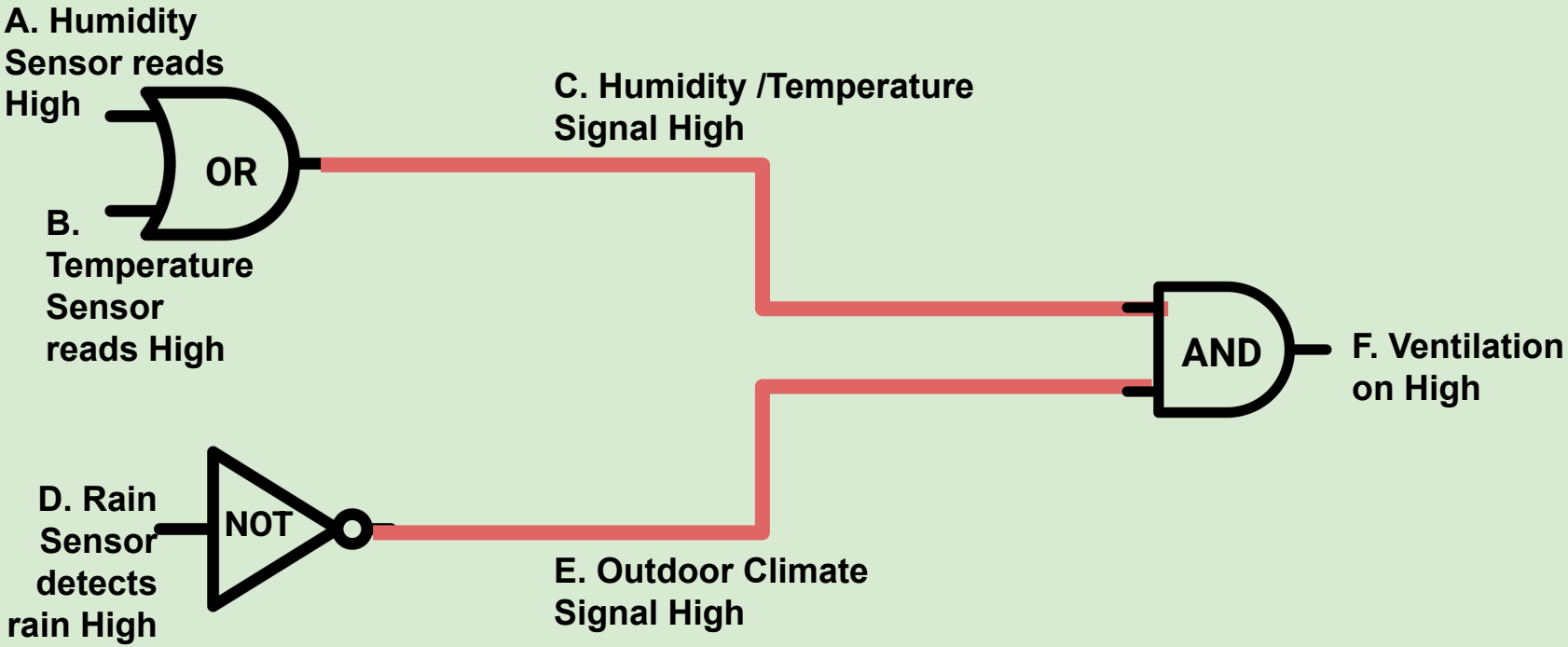
Chemical Manufacturing Safety System-Truth Tables

AND GATE		
Input A Pressure Sensor	Input B Temperature	Output C Signal of temperature/ pressure sensors
Excessive pressure -1	Excessive temperature- 1	Temperature & pressure sensors signal- 1
Excessive pressure -1	Temperature below threshold- 0	Temperature & pressure sensors signal- 0
Pressure below threshold- 0	Excessive temperature- 1	Temperature & pressure sensors signal- 0
Pressure below threshold- 0	Temperature below threshold- 0	Temperature & pressure sensors signal- 0

OR GATE		
Input D Gas leak detection	Input C Signal of temperature & pressure sensors	Output E Gas, Temperature, and Pressure sensors signal
Gas leak detected-1	Ventilation blocked by rain signal -0	Gas, Temperature, and Pressure Warning signal -1
Gas leak detected-1	Ventilation not blocked by rain signal -1	Gas, Temperature, and Pressure Warning signal -1
Gas leak not detected- 0	Ventilation blocked by rain signal -0	Gas, Temperature, and Pressure Warning signal -0
Gas leak not detected- 0	Ventilation not blocked by rain signal -1	Gas, Temperature, and Pressure Warning signal -1

NOT GATE	
Input E Gas, Temperature, and Pressure sensors signal	Output F System shutdown initiation
Gas, Temperature, and Pressure Warning signal -1	Machines shut down- 0
Gas, Temperature, and Pressure Warning signal not activated -0	Machines continue as normal- 1

Smart Greenhouse Ventilation System-Integration Diagram



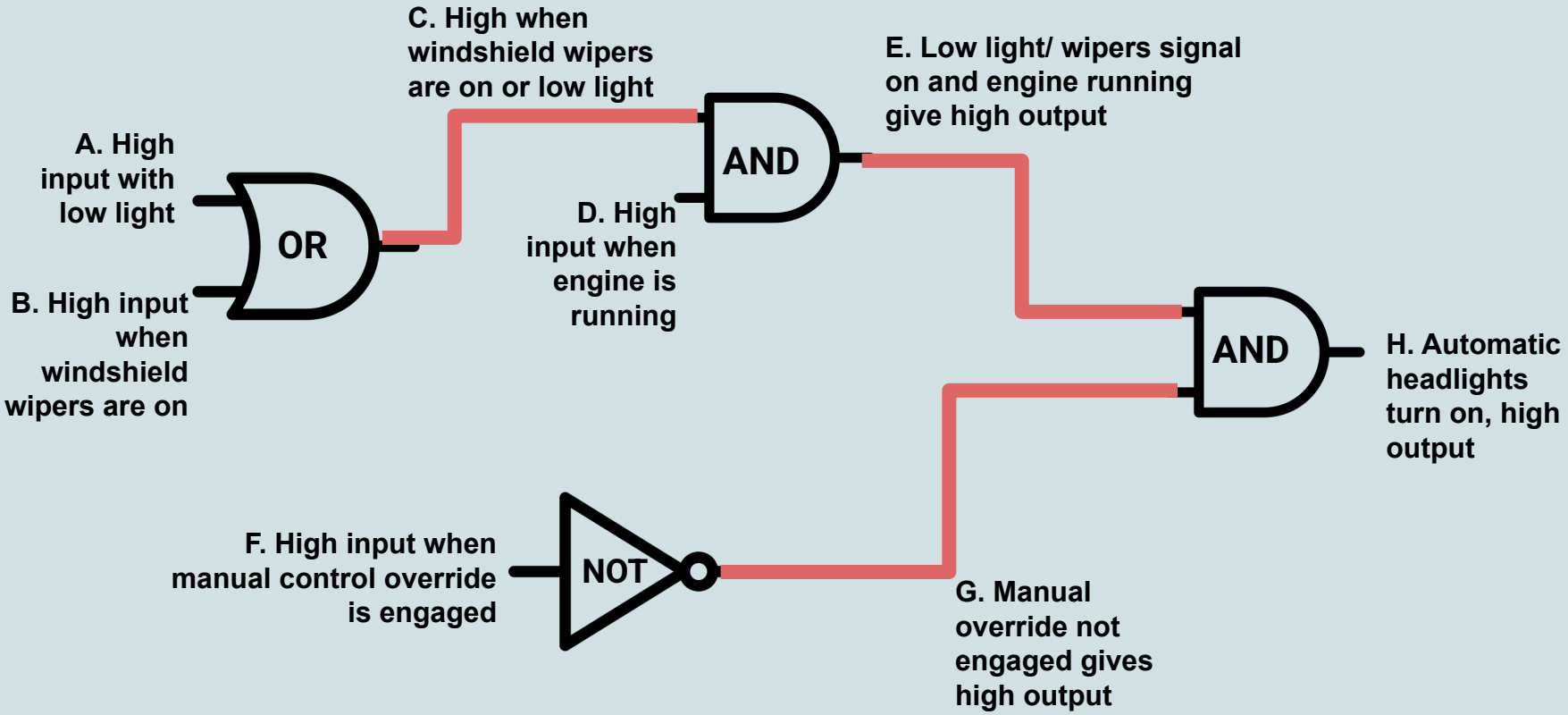
Smart Greenhouse Ventilation System System-Truth Table

OR GATE		
Input A Humidity in the greenhouse	Input B Temperature in the greenhouse	Output C Signal of temperature/ humidity sensors
Excessive humidity -1	Excessive temperature- 1	temperature/ humidity sensor signal- 1
Excessive humidity -1	Temperature below threshold- 0	temperature/ humidity sensor signal- 1
Humidity below threshold- 0	Excessive temperature- 1	temperature/ humidity sensor signal- 1
Humidity below threshold- 0	Temperature below threshold- 0	temperature/ humidity not detected- 0

NOT GATE	
Input D Rain outside the greenhouse	Output E signal regarding rain
Rain detected-1	Ventilation blocked by rain signal -0
Rain not detected- 0	Ventilation not blocked by rain signal -1

AND GATE		
Input C Signal of temperature/ humidity sensors	Input E signal regarding rain	Output F Ventilation Status
temperature/ humidity sensor signal- 1	Ventilation blocked by rain signal -0	Ventilation off- 0
temperature/ humidity sensor signal- 1	Ventilation not blocked by rain signal -1	Ventilation on- 1
temperature/ humidity not detected- 0	Ventilation blocked by rain signal -0	Ventilation off- 0
temperature/ humidity not detected- 0	Ventilation not blocked by rain signal -1	Ventilation off- 0

Automobile Headlight Control System-Integration Diagram



Automobile Headlight Control System-Truth Table

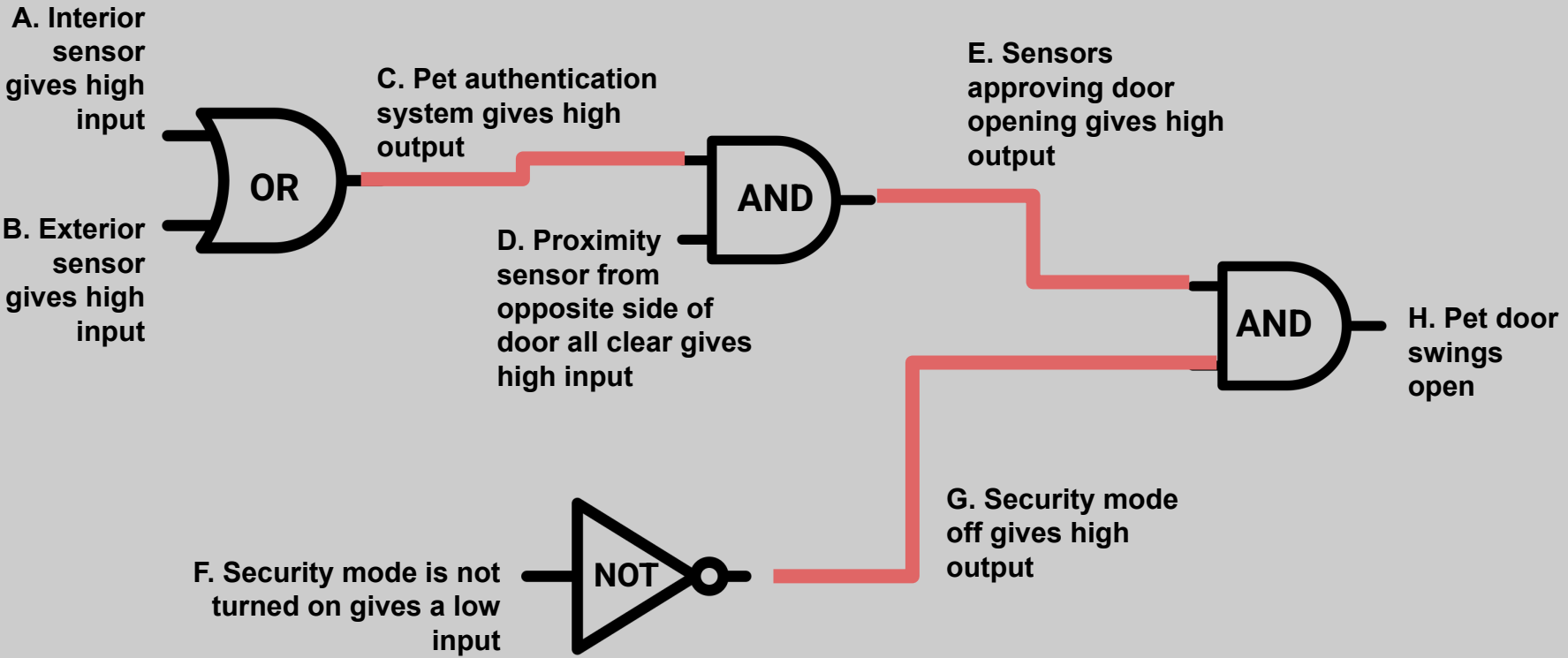
OR Gate		
Input A: Photocell reading	Input B: Windshield Wiper Status	Output C: Photocell and wiper sensors
1 Low light detected	1 windshield wipers on	1 Low light/ wipers on signal high
1 Low light detected	0 wipers off	1 Low light signal high
0 Low light not detected	1 windshield wipers on	1 Wipers on signal high
0 Low light not detected	0 wipers off	0 adequate light and wipers not detected

NOT Gate	
Input F: Manual control Override Status	Output G: Signal of Manual Override Mode
1 Manual Override is Engaged	0 Signal from Override Sensor on to block automatic operation
0 Manual Override is not engaged	1 Signal from Override sensor is clear

First AND Gate		
Input C: Photocell and wiper sensors	Input D: Engine is running	Output E: Light, wipers, engine conditions
1 Low light/ wipers on signal high	1 engine is running	1 all criteria met
1 Low light/ wipers on signal high	0 engine is not running	0 light/ wipers indicated but engine is not running
0 adequate light/ wipers not detected	1 engine is running	0 engine is running but light/ wipers not on
0 adequate light/ wipers not detected	0 engine is not running	0 light/ wipers and engine not detected

Second AND Gate		
Input E: Light, wipers, engine conditions	Input G: Signal of Manual Override Mode	Output H: State of automatic headlights
1 light / wipers and engine on	0 Signal from Override Sensor on blocking automatic operation	0 automatic headlights not on
1 light / wipers and engine on	1 Override signal not on	1 automatic headlights on
0 Light / wipers and engine not indicated	1 Override signal not on	0 automatic headlights not on
0 Light / wipers and engine not indicated	0 Signal from Override Sensor on blocking automatic operation	0 automatic headlights not on

Smart Pet Door System-Integration Diagram



Smart Pet Door System-Truth Table

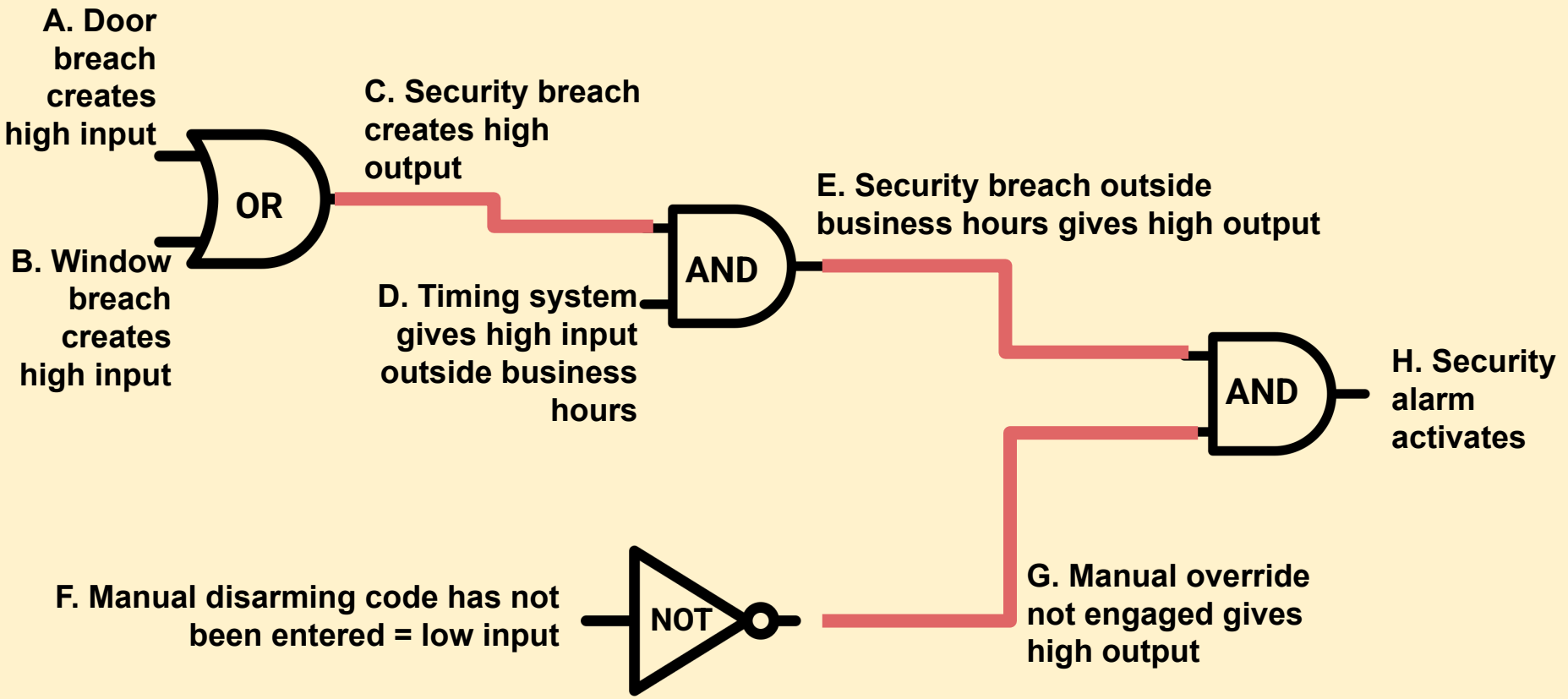
OR Gate		
Input A: Microchip sensor located inside the home	Input B: Microchip sensor located outside the home	Output C: Signal of Pet Authentication Sensors
1 Chip detected	1 Chip detected	1 Open Door
1 Chip detected	0 Chip not detected	1 Open Door
0 Chip not detected	1 Chip detected	1 Open Door
0 Chip not detected	0 Chip not detected	0 No signal, door remains closed.

First AND gate		
Input C: Pet Authentication	Input D: Proximity Sensor	Output E: Signal of approval to open door
1- Authenticated	1 space is clear	1- Open door
1-Authenticated	0 obstruction detected	0-Do not open
0-No authentication	1 space is clear	0-Do not open
0-No authentication	0 obstruction detected	0-Do not open

NOT Gate	
Input F: Security Mode	Output G: Signal of Mode
1 Security Mode Engaged	0 Door can’t open
0 Security mode not engaged	1 Door can open

Second AND Gate		
Input E: Approvals	Input G: Security	Output H: State of door
1 Approved	1 disengaged	1 door opens
1 Approved	0 engaged	0 door stays closed
0 Not Approved	1 disengaged	0 door stays closed
0 Not Approved	0 engaged	0 door stays closed

Security System-Integration Diagram



Security System-Truth Table

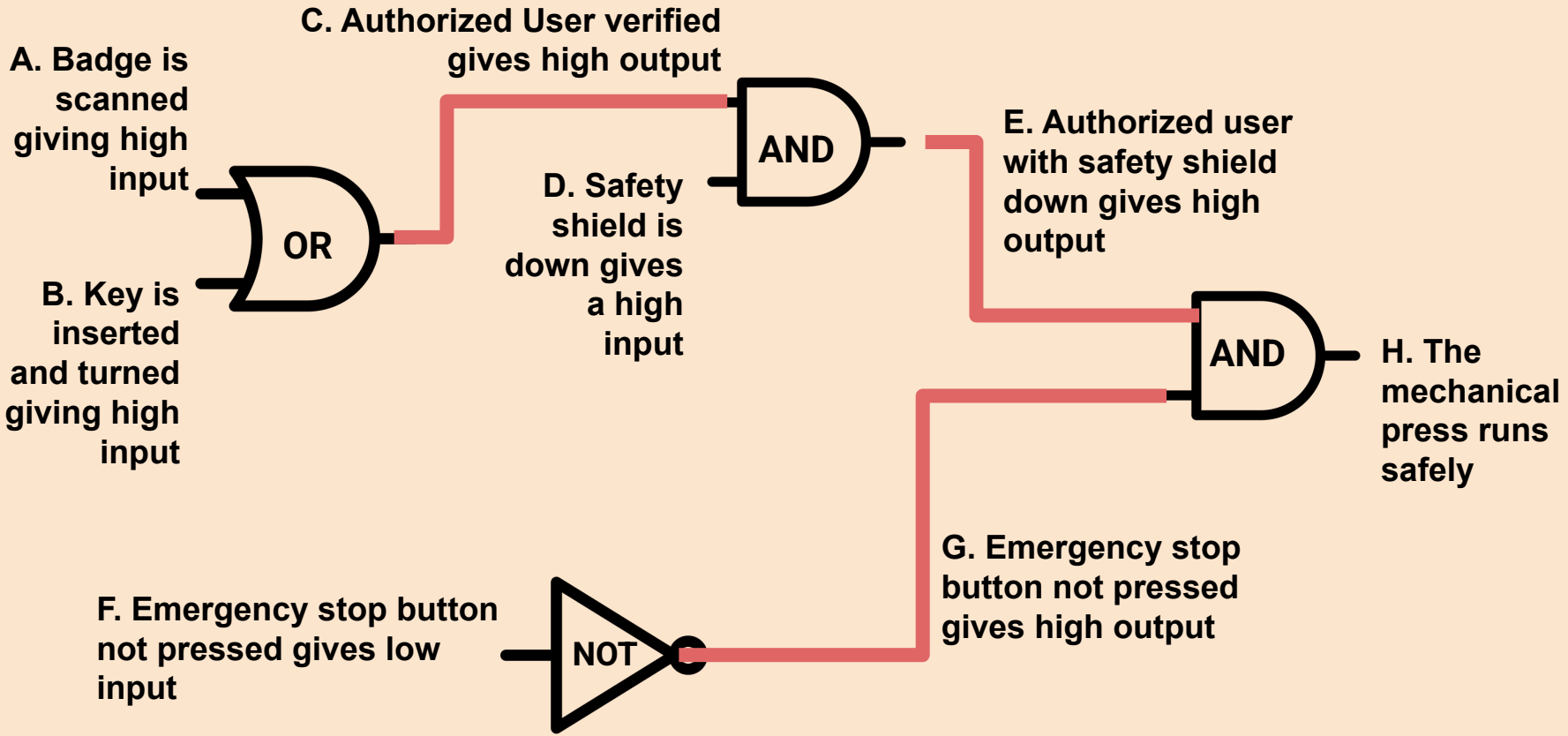
OR Gate		
Input A: Door Breach	Input B: Window Breach	Output C: Signal of Break in
1 Breach detected	1 Breach detected	1 Proceed with alarm
1 Breach detected	0 Breach not detected	1 Proceed with alarm
0 Breach not detected	1 Breach detected	1 Proceed with alarm
0 Breach not detected	0 Breach not detected	0 No signal, Do not activate alarm.

NOT Gate	
Input F: Manual Disarming Code	Output G: Signal to disarm or not
1 Code entered	0 Do not activate alarm.
0 Code not entered	1 Alarm can be activated

First AND gate		
Input C: Breach detection	Input D: Outside hours timing system	Output E: Signal to approve alarm activation
1- Breach detected	1 Outside of hours	1- Proceed with alarm
1-Breach detected	0 Inside of hours	0-Do not activate alarm.
0-No Breach detected	1 Outside of hours	0-Do not activate alarm.
0-No Breach detected	0 Inside of hours	0-Do not activate alarm.

Second AND Gate		
Input E: Approvals	Input G: Disarm	Output H: State of alarm
1 Approved	1 disengaged	1 Alarm Sounds
1 Approved	0 engaged	0 no alarm sounds
0 Not Approved	1 disengaged	0 no alarm sounds
0 Not Approved	0 engaged	0 no alarm sounds

Mechanical Press Safety System-Integration Diagram



Mechanical Press Safety System-Truth Table

OR Gate		
Input A: Authorization Card	Input B:Master Key	Output C: Signal to run the press
1 Scanned	1 Engaged	1 Okay to run
1 Scanned	0 Not Engaged	1 Okay to run
0 Not Scanned	1 Engaged	1 Okay to run
0 Not Scanned	0 Not Engaged	0 No signal, Press will not operate.

First AND gate		
Input C: User Authentication	Input D: Safety Shield	Output E: Signal of approval to run press
1- Authenticated	1 Down	1- Okay to run
1-Authenticated	0 Up	0-No signal, Press will not operate.
0-No authentication	1 Downr	0-No signal, Press will not operate.
0-No authentication	0 Up	0-No signal, Press will not operate.

NOT Gate	
Input F: Emergency Stop Button	Output G: Signal to proceed
1 Emergency Stop Engaged	0 No signal, Press will not operate.
0 Security mode not engaged	1 Okay to run

Second AND Gate		
Input E: Approvals	Input G: Emergency Stop	Output H: State of door
1 Approved	1 disengaged	1 Press Operates Normally
1 Approved	0 engaged	0 Press will not operate.
0 Not Approved	1 disengaged	0 Press will not operate.
0 Not Approved	0 engaged	0 Press will not operate.