USE CASE

GAS STATION PUMP

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For this deliverable our team developed the use cases associated with the gas station pump system. Our team explored as many use cases as we could, as well as fully documenting an important use case.

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Prioritized List of Use Cases (Highest to Lowest)

- Authorize Card Payment
- Authorize Debit Payment / Authorize Credit Payment
- Process Pump Sale
- Process Prepaid Sale
- Calculate Total

Use Case Diagram

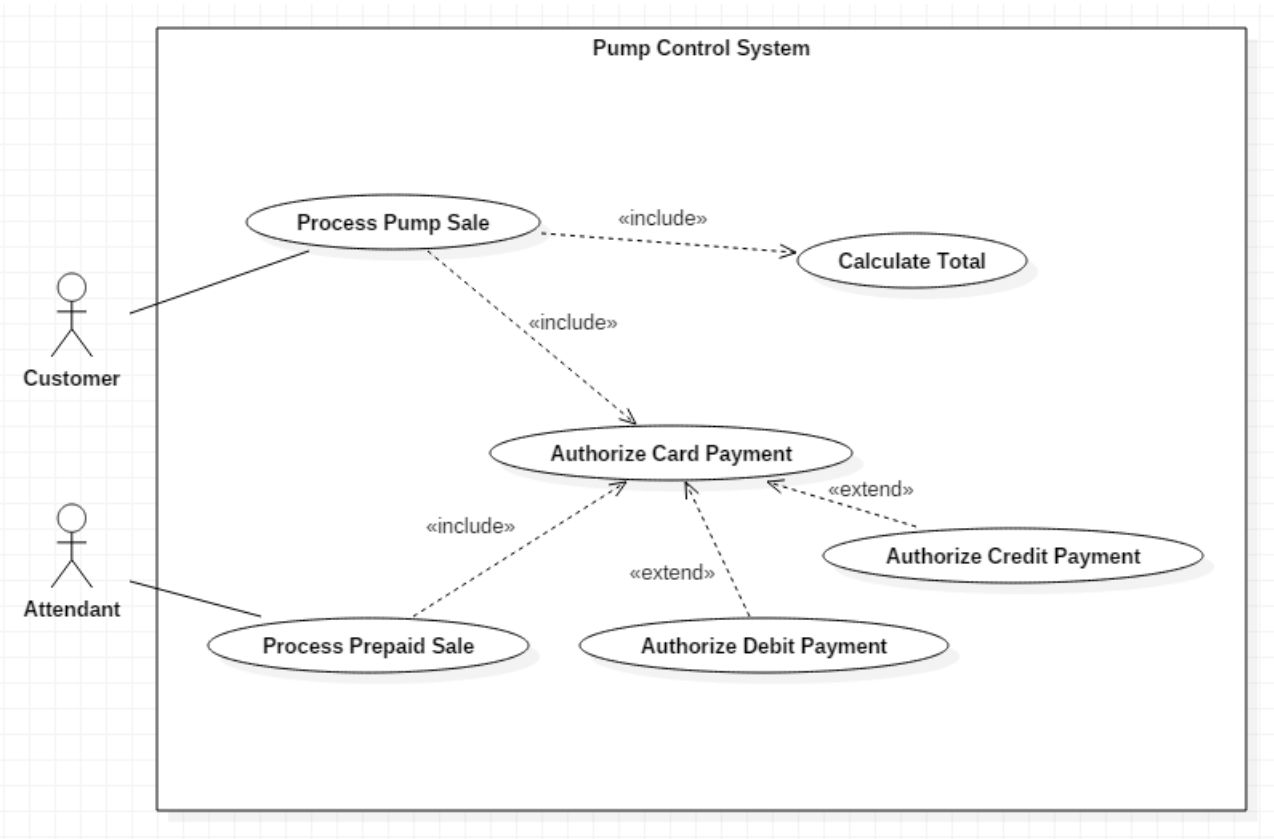

Figure 1: Use Case Diagram for the Pump Control System

Fully Dressed Use Case

UC1: Process Pump Sale

Primary Actor: Customer

Stakeholders and Interests:

Gas Attendant

- Wants accurate payment collection because cash drawer shortages are may be deducted from his/her salary.
- Wants fast response systems for great customer service.

Customer

- Wants fast service at the gas station and a seamless gas purchase experience.
- Wants proof of purchase to support purchase transaction.

Gas Station

- Wants to accurately record gas purchase transactions
- Wants to accurately record payment authorizations
- Wants to provide backup systems to sales capture when server components (e.g., remote credit validation) are unavailable.
- Wants automatic and fast update of accounting and inventory.
- Wants to provide maximum customer satisfaction
- Wants to provide a safe gas pumping environment for customers.

Government Tax Agencies

- Want to collect tax from every gas purchase sale. May be multiple agencies, such as national, state, and county.

Bank System

- Wants to receive digital authorization requests in the correct format and protocol.
- Wants to accurately account for their payables to the store.
- Wants to prevent fraudulent payment transactions at the gas pump.

Preconditions

- There should be gas in pump
- Customer should have a credit or debit card

Success Guarantee (Post conditions):

- Sale is saved.
- Tax is correctly calculated. Gas Inventory is updated.
- Payment authorization approvals are recorded.

Main Success Scenario (or Basic Flow):

1. Customer arrives at the gas station and selects an available gas pump.
2. Customer inserts the credit card into the card reader to start a new sale.
3. Use Case: Authorize Card Payment
4. The system records the payment authorization.
5. The system logs completed sale and sends sale and payment information to the Gas Inventory system.
6. The system unlocks the pumps for diesel and gasoline.
7. The customer selects the diesel option.
8. The customer removes the handle from the holder and lifts the latch.
9. The customer inserts the handle into the vehicle gas tank.
10. The customer continuously presses the pump trigger and the gas flows.
11. The system calculates and displays the running total and quantity.
12. Customer stops when the desired amount of money or quantity of gas is reached.
13. Customer returns the handle to the holder.
14. System prompts the customer with an option to print sale receipt.
15. Customer choses to print receipt.
16. System calculates the total and taxes.
17. System presents the receipt with the quantity of gas and total sale amount.
18. The use case ends successfully.

Extensions (or Alternative Flows):

*. At any given time, when System fails:

- To support recovery and correct accounting, ensure all transaction sensitive state and events can be recovered from any step of the scenario.

1. All gas pumps occupied.

- The customer waits until one gas pump becomes unoccupied.
- The customer proceeds to the unoccupied gas pump.
- The use case resumes at step 2.

2a. Customer inserts a debit card

- The system prompts the customer with a PIN request.
- The customer inputs to respective number.
- The use case resumes at step 3.

2b. Customer inserts the card incorrectly.

- The system displays a message to the user informing that the card was inserted incorrectly.
- The customer removes the card and inserts it correctly into the card reader.
- The use case resumes at step 3.

7. The customer selects the gasoline option.

- The system lights the available gasoline grade options for customer selection.
- The customer selects the desired grade option.
- The system unlights the other options.
- The use case resumes at step 8.

10. The customer engages the handle clip.

- The system activates automatic gas flow.

12. The tank is full.

- System detects the tank is full and stops the flow.
- The use case resumes at step 13.

Special Requirements:

- All button lights must be visible in all lighting conditions.
- The gas pump display must be visible from 0.5 meter and the font must be legible.

Technology and Data Variations List:

- Credit card or debit card authorization request capture through a ***swipe card reader***
- Debit card PIN and receipt request entered through a ***keypad with integrated braille***
- Credit card or debit card authorization status response on ***display screen***
- Running gas quantity and running purchase total displayed on ***gas pump display***
- Communication between customer at gas pump station and gas station attendant is via a ***speaker***
- Gas purchase details printed by ***receipt printer***

Frequency of Occurrence:

- Could be nearly continuous.

Open Issues:

- Can the customer receive a warning if the gas quantities are running low in the middle of a transaction?
- Can a single gas pump station handle parallel transactions? One customer purchasing regular gasoline while another is purchasing diesel.
- Explore a monitoring system that prevents customers from breaking safety rules. Monitor the use of cell-phones or smoking while operating a gas pump.
- What customization can be done for the gas pump station to accept cash payments?