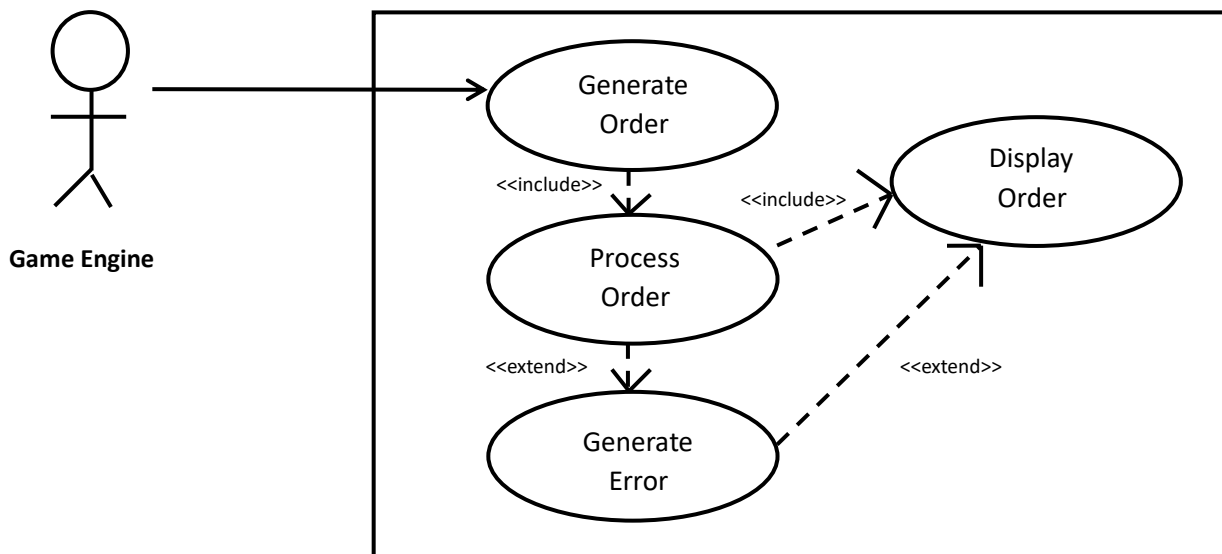


1. Brief introduction __/3

This feature consists of an automated order-taking animation. Orders are randomly generated by the system and displayed sequentially through an animation that simulates an active ordering process. There is no user interaction involved; the feature is intended purely as a visual demonstration of system behavior and order flow.

2. Use case diagram with scenario _14

Use Case Diagrams



Scenarios

Name: Order Taking Animation

Summary: The system automatically generates and displays orders through an animation.

Actors: System (Game/Application Engine).

Preconditions: Game is running

Basic sequence:

Step 1: The start triggers the system to start order generation.

Step 2: The system generates a random order.

Step 3: The system processes the order.

Step 4: The system displays the order animation.

Exceptions:

Step 2: Random order generation fails (defined by the processing feature), and the system generates a default order instead.

Post conditions: An order has been displayed and cleared.

- System is ready to generate the next order.

Priority: 1*

ID: OTA1

*The priorities are 1 = must have, 2 = essential, 3 = nice to have.

3. Data Flow diagram(s) from Level 0 to process description for your feature _____14

Data Flow Diagrams

Context Diagram

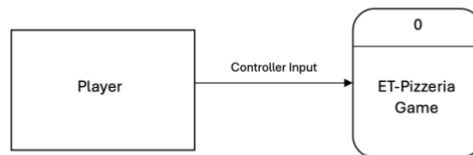
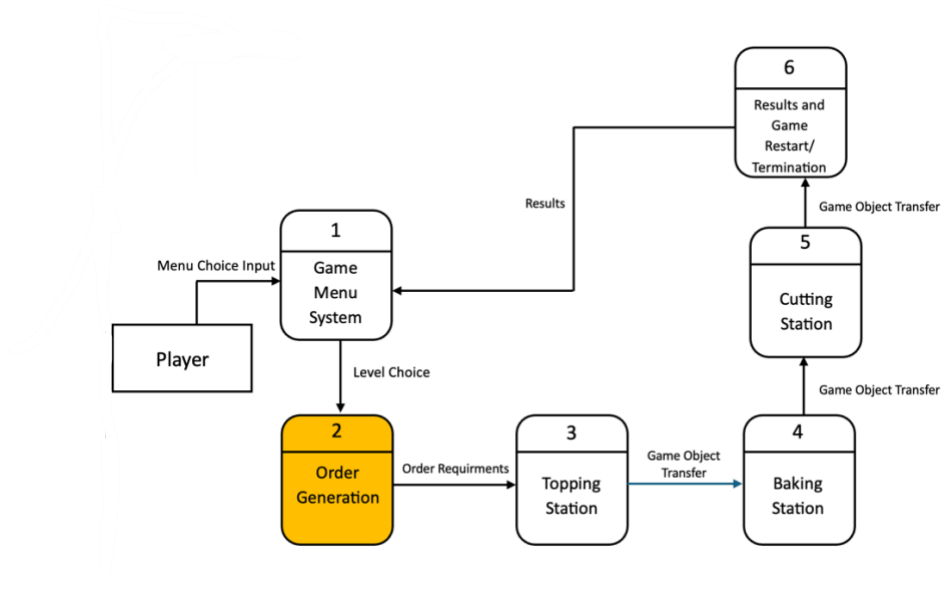
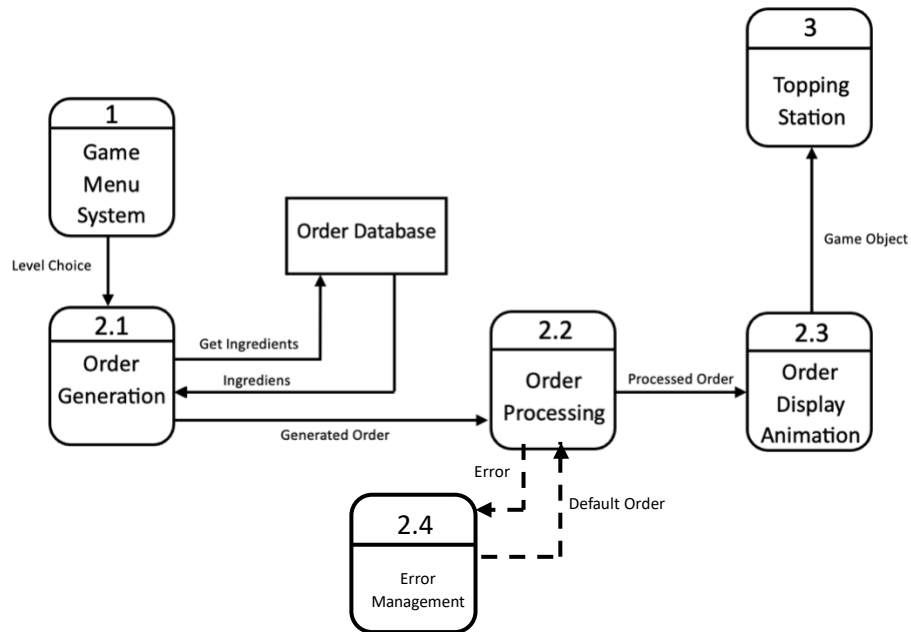


Diagram 0





Process Descriptions

Order_Generation*:

INPUT: level_choice

OUTPUT: generated_order

BEGIN

RECEIVE level_choice FROM Game_Menu_System

// Step 1: Request ingredient list from database

SEND "Get Ingredients" TO Order_Database

RECEIVE ingredient_list FROM Order_Database

// Step 2: Generate order based on difficulty level

IF level_choice == "Easy" THEN

number_of_ingredients ← RANDOM(1 TO 2), SHORT_BAKE_TIME, HALF_CUT

ELSE IF level_choice == "Medium" THEN

number_of_ingredients ← RANDOM(2 TO 4), STANDARD_BAKE_TIME, FOUR_CUT

ELSE IF level_choice == "Hard" THEN

```
number_of_ingredients ← RANDOM(4 TO 6), EXTENDED_BAKE_TIME, EIGHT_CUT
```

```
ENDIF
```

```
generated_order ← SELECT random ingredients  
FROM ingredient_list  
BASED ON number_of_ingredients
```

```
SEND generated_order TO Order_Processing
```

```
END
```

Order_Processing*:

INPUT: generated_order

OUTPUT: processed_order

```
BEGIN
```

```
RECEIVE generated_order FROM Order_Generation
```

```
// Step 1: Validate order
```

```
IF generated_order IS EMPTY THEN
```

```
    SET processed_order.status ← "ERROR"
```

```
    SEND processed_order.status TO Error_Management
```

```
    EXIT PROCESS
```

```
ENDIF
```

```
// Step 2: Structure order for animation
```

```
processed_order.ingredients ← generated_order
```

```
processed_order.timestamp ← CURRENT_TIME
```

```
processed_order.status ← "READY"
```

```
SEND processed_order TO Order_Display_Animation
```

```
END
```

Error_Management*:

INPUT: processed_order.status

OUTPUT: processed_order

```

BEGIN
    RECEIVE processed_order.status FROM Order_Processing

    // Step 1: Validate status
    IF processed_order.status IS OK THEN
        SEND processed_order TO Order_Processing
        EXIT PROCESS
    ENDIF

    // Step 2: Correct Error
    SET processed_order.status ← "OK"
    SET processed_order TO default_order
    SEND processed_order TO Order_Processing
END

```

4. Acceptance Tests _____9

This feature contains both deterministic elements (animation timing, order structure, process sequence) and random elements (order content generation). Therefore, acceptance testing will focus on validating bounded randomness, structural correctness, process sequencing, timing constraints, and system stability under extended execution. The acceptance tests described below validate the feature at three levels: Order Generator, Animation Processor, and Full System Integration.

Order Generator Testing

The Order Generator will be executed automatically 200 times to test the limits of randomness and structural validity. Each order generated will be written to an output file containing:

- Cycle number
- Order ID
- Order contents
- Generation timestamp
- Generation status (Success/Failure)

The output file will be analyzed for the following measurable conditions:

Random Distribution Constraints:

- At least 65% of orders generated must be unique within 200 cycles.
- No individual order configuration may appear more than 25% of the total executions.
- If order categories exist (e.g., single item, combo, special), each category must appear at least once within 50 consecutive cycles.

Structural Validation:

- Each order must contain all required fields.
- No null or undefined values are permitted.
- Order formatting must conform exactly to the predefined data structure.
- Generated data must remain within predefined logical bounds (e.g., valid item names only).

Failure Handling Validation:

The order generator will be intentionally forced to fail (simulated exception or null return). When failure occurs:

- The system must generate a predefined default order.
- The failure must be recorded in the log file.
- The system must continue execution without terminating.
- The default order must only appear when a generation failure occurs.

Animation Processor Testing

The animation process will be tested for correct sequencing, timing consistency, and visual clearing behavior.

The animation loop will run for 100 continuous cycles. Timestamps will be recorded for:

- Animation start time
- Animation end time
- Next cycle start time

The following measurable constraints must be satisfied:

Timing Constraints:

- Each order must be displayed for the predefined duration (± 0.5 seconds tolerance).
- The delay between clearing one order and generating the next must not exceed 1 second.
- No order may remain visible beyond its assigned duration.

Sequencing Constraints:

The process must strictly follow this sequence:

Generate Order → Process Order → Display Order → Clear Order → Generate Next Order
If the process deviates from this sequence at any point, the test is considered a failure.

Rendering Failure Simulation:

If animation rendering fails:

- The system must log the error event.
- The animation cycle must automatically restart.
- No system crash, freeze, or infinite loop may occur.

Integration and Stability Testing

The complete feature (Order Generator + Animation Processor combined) will be executed for 500 total cycles to test long-term system behavior.

The following conditions must be verified:

- No runtime exceptions occur.
- Memory usage remains stable (no accumulation of undeleted objects).
- CPU usage remains within acceptable operational bounds.
- The system runs continuously without user input.
- Orders continue generating sequentially without interruption.

Any crash, freeze, unhandled exception, or improper termination constitutes a failure of the acceptance test.

Example Output Test Analysis for Success/Failure

Cycle	Order ID	Unique	Display Time	Generation Success	Animation Success	Default Used	Success	Fail
1	#102	Yes	3.01s	Yes	Yes	No	Yes	No
48	#102	No	3.00s	Yes	Yes	No	Yes	No
89	Default	—	3.02s	No	Yes	Yes	Yes	No
212	#310	Yes	4.20s	Yes	No	No	No	Yes

Final Acceptance Conditions

The feature will be accepted if:

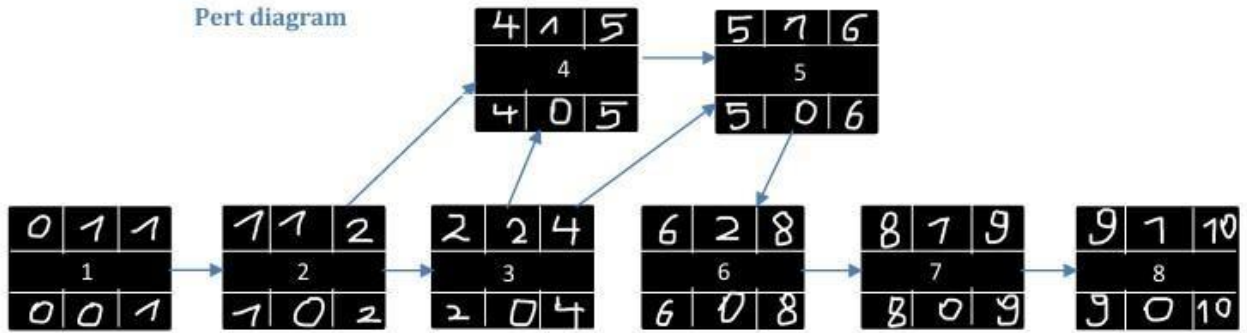
- Random order generation remains within defined statistical limits.
- Orders are structurally valid in 100% of executions.
- Animation timing remains within tolerance bounds.
- The system recovers from simulated failures.
- No crashes or major interruptions occur during extended execution.
- The feature operates fully autonomously without user interaction.

5. Timeline ____/10

Work items

Task	Duration (PWks)	Predecessor Task(s)
1. Requirements Collection	4	-
2. Order Logic Design	4	1
3. Animation Design	8	2
4. Random Order Generation	4	2, 3
5. Animation Integration	2	3, 4
6. Programming	10	5
7. Testing	4	6
8. Deployment	4	7

Pert diagram



Gantt timeline

Key:



Work Hours

