

CS 566: Voice Assistants HW2 - Alexa Skills

Author : Chethana Muppalam

Step 1 - Invocation Name

Use Case: Order Ice-Cream

Invocation name: “quick scoop”

Step 2 - Intents

Intent: OrderIceCreamIntent

Description: This intent allows users to order ice-cream by specifying the quantity and dietary preferences option.

Step 3 - Slots and Slot Types

Slot 1: DietaryPreference

Slot Type (Custom): DietaryPreference

Values: "vegan", "gluten-free", "sugar-free", "dairy-free", "regular"

Slot 2: Quantity

Slot Type (Built-in): AMAZON.NUMBER

This will capture positive whole numbers like "1", "2", "3", etc.

Step 4 - Sample Utterances

1. I am craving for Ice cream. Can you help?
2. Help me order {Quantity} ice creams, please.
3. I would like to have {Quantity} ice creams.
4. Can I get {DietaryPreference} ice cream for under twenty bucks?
5. I want a {DietaryPreference} ice cream.
6. Please order {Quantity} {DietaryPreference} ice creams.
7. I'd like {Quantity} ice creams with a {DietaryPreference} option.
8. Get me {Quantity} ice creams that are {DietaryPreference}.
9. Place an order for {Quantity} ice creams – make sure they're {DietaryPreference}.
10. I need {Quantity} {DietaryPreference} ice creams delivered.

11. Order {Quantity} ice creams, and please make them {DietaryPreference}.
12. Could you get me {Quantity} ice creams, ensuring they are {DietaryPreference}?
13. I'd like to try the Salt and Straw Mango flavor. Can you order {Quantity} of them via uber eats.
14. Please arrange {Quantity} ice creams that are {DietaryPreference}, delivered by Doordash.
15. Get me {Quantity} servings of Brownies Gooey ice cream with a {DietaryPreference} twist.
16. I want {Quantity} ice creams. Make sure at least one is {DietaryPreference} and have them ready for pickup at noon.

Step 5 - Logic for the Intent(Pseudo Code)

The below cases are covered in the algorithm.

1. Infinite Loop Prevention:

A retry counter ensures the skill doesn't get stuck in an infinite loop. After max retries (e.g., 5), the skill exists to avoid frustrating the user.

2. Topic Switching:

If the user tries to switch topics (e.g., "Tell me a joke"), the skill gently guides them back to the ice cream order flow.

3. Resolving Ambiguity:

If the user picks an Invalid choice, appropriate guidance and actions are suggested.

4. Exit:

If the user exceeds the retry limit, the skill exits gracefully with a friendly message.

5. Success Flow/ Instruction confirmation:

A happy case where a summary of the confirmation of the Instruction is populated before exit.

Intent Logic:

When OrderIceCreamIntent is triggered:

Prompt : Welcome message is triggered

Initialize retry counter to 0

Initialize max retries to 10

WHILE retry counter < max retries:

Extract slots: Quantity and DietaryPreference

IF quantity is not between 1 and 50:

Add 1 to retry count

Tell user: "Stores around can serve between 1 and 50 ice creams pints per order"

Reprompt: "Please pick a number from this range"

Wait for user response

Continue loop

IF Quantity is missing: # Error Check

Add 1 to retry count

Tell user: "How many ice creams would you like? Please choose between 1 and 50"

Reprompt: "Unfortunately the stores allow only up to 50 pints per order. Say a number between 1 and 50"

Wait for user response

Continue loop

IF DietaryPreference is missing: # Error Check

Add 1 to retry count

Tell user: "What dietary preference should the ice cream have? For example, vegan or gluten-free"

Reprompt: "Please specify a dietary preference like vegan, gluten-free, sugar-free, or dairy-free"

Wait for user response

Continue loop

IF user switches topic: # Error Check

Add 1 to retry count

Reprompt: "Please provide both quantity and dietary preference. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, gluten-free or dairy-free"

Wait for user response

Continue loop

IF Quantity is not a valid range integer: **# Error Check**

Add 1 to retry count

Tell user: "Stores around can serve between 1 and 50 ice creams pints per order"

Reprompt: "Please pick a number from this range"

Wait for user response

Continue loop

IF DietaryPreference is not in ["regular", "vegan", "dairy-free", "sugar-free", "sugar free", "dairy free", "gluten-free", "gluten free"]: **# Error Check**

Add 1 to retry count

Tell user: "Please choose regular, vegan, or dairy-free for your ice cream preference"

Wait for user response

Continue loop

IF both quantity and dietary preference are valid:

Tell user: "Got it! You're ordering {Quantity} {DietaryPreference} ice cream(s). Should I proceed?"

Wait for user confirmation

IF user confirms:

Tell user: "Your order for {Quantity} {DietaryPreference} ice cream(s) has been placed. Thank you!"

Exit loop

IF retry counter >= max retries: # Error Check

Tell user: "It seems I'm having trouble understanding. Let's take a break and try again later.
Goodbye!"

End conversation

Step 6:

Attached code separately

Step 7: Testing

Note : 1-4 are sample happy cases fulfilling the intent

4 are sample error handling cases(Infinite Loop Prevention, Topic Switch cases)

Test 1:

User: open quick

Alexa: Welcome to Quick Scoop! To get started with your order, Say 'Order ice cream with quantity and dietary preference'.

User: could you get me two ice creams from Dessert Haven ensuring they are vegan

Alexa: Order confirmed! 2 vegan ice creams coming soon!

Test 2:

User: open quick scoop

Alexa: Welcome to Quick Scoop! To get started with your order, Say 'Order ice cream with quantity and dietary preference'.

User: i'm craving for gluten free mango ice cream

Alexa: Please provide both quantity and dietary preference. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, gluten-free or dairy-free.

User: eight gluten free please

Alexa: Order confirmed! 8 gluten free ice creams coming soon!

Test 3:

User: hey alexa open quick scoop

Alexa: Welcome to Quick Scoop! To get started with your order, Say 'Order ice cream with quantity and dietary preference'.

User: help me order two pints ice cream

Alexa: Please provide both quantity and dietary preference. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, gluten-free or dairy-free.

User: i'd like three vegan ice creams from salt and straw

Alexa: Order confirmed! 3 vegan ice creams coming soon!

Test 4:

User: quick scoop

Alexa: Welcome to Quick Scoop! To get started with your order, Say 'Order ice cream with quantity and dietary preference'.

User: let's get that salt and straw caramel brownie

Alexa: Please provide both quantity and dietary preference. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, or dairy-free.

User: dairy free two pints

Alexa: Order confirmed! 2 dairy free ice creams coming soon!

Test 5: Infinite Loops and Topic Switch/Restart Scenarios are handled - VA retries for Maximum number of times provided(5 In this case), if the user response doesn't meet the command, gently ends with a goodbye after retries!

User: open quick scoop

Alexa: Welcome to Quick Scoop! To get started with your order, Say 'Order ice cream with quantity and dietary preference'.

User: order ice cream

Alexa: Please provide both quantity and dietary preference. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, or dairy-free.

User:two only

Alexa:Please provide both quantity and dietary preference. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, or dairy-free.

User:tell me a joke

Alexa:Please provide both quantities. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, or dairy-free.

User:when is my birthday

Alexa:Please provide both quantity and dietary preference. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, or dairy-free.

User:what is today weather

Alexa:Please provide both quantity and dietary preference. For quantity, choose between 1-50. For dietary preference, choose regular, vegan, sugar-free, or dairy-free.

User:what languages you speak

Alexa:I'm having trouble understanding your order. Please try again later. Goodbye!

Step 8 - Review and Reflection

Impressions:

To be honest, I enjoyed this Assignment building with ADC.It was definitely a very good learning experience. I used AWS services already but I primarily worked on Cloud and Storage services. Working on alexa skills was something of a very good intake for me. Initially, I started with VS Code, but while coding and testing, I found ADC more convenient and preferred it over VS Code - it just felt easier. I particularly enjoyed configuring intents and coding while revisiting the design I developed in my previous assignment.

There were several tricky parts:

- I encountered some strange issues with language settings. My AWS account is originally based in India, and while testing Alexa skills, I frequently received responses like, 'Your Amazon account is based in India. Try changing the language to English (IN) or Hindi.' I spent a significant amount of time resolving this issue. If you're wondering why my `InteractionModels/custom` folder contains JSON files for five countries, this is the reason.

- Fulfilling the intent within the conversation and considering edge cases was challenging.

Design vs Implementation:

I tried to incorporate the majority of the cases I worked on in a design assignment.

Things I Incorporated:

Handling all edge cases, such as error handling, infinite loop prevention, topic switching, Order confirmation.

Things I Added That Weren't in the Design:

Topic Switch Scenario – In Discussion 2, one of my group members brought up the idea of how a VA should react or handle a situation when the user switches the ongoing topic. I tried to incorporate a version of this case.

Things I Modified:

VA Final Order Confirmation Message Mentioning Order Highlights – While this isn't really a change, my final order confirmation includes only the two slot values since that's all I can capture. I couldn't fully handle ambiguity because I felt fallback actions needed to be addressed in a separate intent, which I didn't have enough time to complete within the submission deadline.

User Input:

I decided to handle the input in that way because For my use case to satisfy a meaningful order, I feel that both slots (Quantity and Dietary) are necessary for order information. Neither of them alone provides value to a meaningful order. So, I wrote my code logic in such a way that both Slot 1 and Slot 2 are triggered to fulfill the intent. I may change this logic in the future if a slot value alone serves a meaningful purpose. My code handled the following error cases.

1. Retry-based System
 - Tracks attempts using a counter (max 10 retries- can be customized)
 - Gracefully exits after max retries
2. Specific Error Handling Categories:
 - Missing Information
 - Missing quantity → Prompts for number between 1-50
 - Missing dietary preference → Lists valid options

- Invalid Values
 - Quantity out of range (1-50) → Explains store limits
 - Invalid dietary preference → Lists accepted options
- Off-topic Responses
 - User switches topics → Redirects back to order flow

Testing:

Testing Alexa was also fun. I spent most of my time almost 4-5 days testing and modifying the code based on the tests. I created prompts in such a way that they covered possible combinations, changes in the order of slot values, slang, and matching answers for the utterances I used.

I asked my partner to test my VA, and they tried a few cases that I hadn't considered initially.

1. Tested changing the order of the slots and using different informal slang—VA gave the expected results.
2. Tested with multiple values for the same slot, like 'order 2 vegan and 3 gluten-free.'
Interestingly, I found that the VA handled the last phrase was like '3 gluten-free ice creams are coming your way.'

I learned that as a developer, I tend to focus on getting the core functionality right and might overlook some potential edge cases that an intent should fulfill. I feel that testing with another pair of eyes always provides valuable insights and reasons to rethink potential edge cases.