

Nanyang Technological University

School of Computer Science and Engineering



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CZ3005 - Lab 3 (Subway Sandwich Interactor)

Artificial Intelligence

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SSP 2

Introduction

The goal of this assignment is to create a Dialogue AI in Prolog, the scenario being a interactive menu from which customers can customize their Subway sandwich order, with the system giving options based on the customers' initial choices. I have chosen to implement a CLI-only solution since it is a simple dialogue application that will not benefit from having a GUI, and Prolog supports reading user input from the CLI. The options in the program is a more limited selection of Subway Singapore's actual menu.

Assumptions:

- Customer can select an unlimited number of vegetable options, and can have multiple servings of the same vegetable.
- All other components have a maximum of 1 choice
- All components, except for add-ons, must have a choice

Solution Rationale

While going through the source code, you may find that instead of asking the user to call `option(bread).` to display the available options for bread, I have a print statement listing the available bread options. While this may seem like hard-coding at first, this is actually to provide greater interactivity without the need for a GUI and more intuitive use of the program. All the user has to do is to enter `start().` to begin running the program and follow the program instructions from there on. Since this is a one-off project with no updates anticipated, there will be no changes to the menu, and hence the strings to be printed will not need to be changed.

Running the Program

1. Make sure *swipl* is installed.
2. Run `subway.pl`
3. Enter `start().` to start.
4. Enter choice followed by period (valid choices will be displayed at end of question).
5. Validate choices by using `choice(X).`

Testing

Scenario	Healthy	Vegan	Value	Pass/Fail
1	N	N	N	Pass
2	N	N	Y	Pass
3	N	Y	N	Pass
4	N	Y	Y	Pass
5	Y	N	N	Pass
6	Y	N	Y	Pass
7	Y	Y	N	Pass
8	Y	Y	Y	Pass

Scenario 1 – No restrictions

```
?- start().
"Would you like your meal to be healthy? y/n"n.
"Would you like your meal to be vegan? y/n"|: n.
"Would you like your meal to be value? y/n"|: n.
"Choose a sandwich option:""1: Italian Wheat, 2. Honey Oat, 3. Flatbread"|: 1.
"1: 6 inch, 2: Foot-long"|: 1.
"Choose a filling:""1: Veggie Patty, 2.: Veggie Delite, 3:Chicken Bacon Ranch, 3.
"Choose add-ons:""1: Processed Cheddar, 2: Monterey Cheddar, 3: Guacamole, 4: N2.
"Do you want more add-ons? y/n"|: n.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni1.
"Would you like to add more vegetables? y/n"|: y.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni1.
"Would you like to add more vegetables? y/n"|: y.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni2.
"Would you like to add more vegetables? y/n"|: n.
"Choose a sauce:""1: Chipotle Southwest, 2: Ranch, 3: BBQ, 4: Chili, 5: Vinegar3.
"Choose a side""1: Chips, 2: Cookies, 3:Salad"|: 2.
"Choose a drink""1: Fountain Drinks, 2: Water, 3: Coffee, 4: Tea"|: 3.
"Use choice(X) to review your meal"
true .

?- choice(X).
X = nothing ;
X = italian_wheat ;
X = six ;
X = chicken_bacon_ranch ;
X = monterey_cheddar ;
X = cucumbers ;
X = cucumbers ;
X = green_bell_peppers ;
X = bbq ;
X = cookies ;
X = coffee.
```

Figure 1

Scenario 2 - Value

```
?- start().
"Would you like your meal to be healthy? y/n"n.
"Would you like your meal to be vegan? y/n"|: n.
"Would you like your meal to be value? y/n"|: y.
"Choose a sandwich option:""1: Italian Wheat, 2. Honey Oat, 3. Flatbread"|: 2.
"1: 6 inch, 2: Foot-long"|: 2.
"Choose a filling:""1: Veggie Patty, 2.: Veggie Delite, 3:Chicken Bacon Ranch, 4.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni1.
"Would you like to add more vegetables? y/n"|: n.
"Choose a sauce:""1: Chipotle Southwest, 2: Ranch, 3: BBQ, 4: Chili, 5: Vinegar1.
"Choose a side""1: Chips, 2: Cookies, 3:Salad"|: 1.
"Choose a drink""1: Fountain Drinks, 2: Water, 3: Coffee, 4: Tea"|: 1.
"Use choice(X) to review your meal"
true .

?- choice(X).
X = nothing ;
X = honey_oat ;
X = twelve ;
X = cold_cut_trio ;
X = cucumbers ;
X = chipotle_southwest ;
X = chips ;
X = fountain_drinks.
```

Figure 2: No add-ons offered

Scenario 3 - Vegan

```
?- start().
"Would you like your meal to be healthy? y/n"n.
"Would you like your meal to be vegan? y/n"|: y.
"Would you like your meal to be value? y/n"|: n.
"Choose a sandwich option:""1: Italian Wheat, 2. Honey Oat, 3. Flatbread"|: 3.
"1: 6 inch, 2: Foot-long"|: 1.
"Choose a filling:""1: Veggie Patty, 2.: Veggie Delite"|: 1.
"Choose add-ons:""1: Guacamole, 2: None"|: 2.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni1.
"Would you like to add more vegetables? y/n"|: n.
"Choose a sauce:""1: Chipotle Southwest, 2: Ranch, 3: BBQ, 4: Chili, 5: Vinegar4.
"Choose a side""1: Salad"|: 1.
"Choose a drink""1: Fountain Drinks, 2: Water, 3: Coffee, 4: Tea"|: 3.
"Use choice(X) to review your meal"
true .

?- choice(X).
X = nothing ;
X = flatbread ;
X = six ;
X = veggie_patty ;
X = cucumbers ;
X = chili ;
X = salad ;
X = coffee.
```

Figure 3: No meat or dairy options offered

Scenario 4 – Vegan, Value

```
?- start().
"Would you like your meal to be healthy? y/n"n.
"Would you like your meal to be vegan? y/n"|: y.
"Would you like your meal to be value? y/n"|: y.
"Choose a sandwich option:""1: Italian Wheat, 2. Honey Oat, 3. Flatbread"|: 1.
"1: 6 inch, 2: Foot-long"|: 1.
"Choose a filling:""1: Veggie Patty, 2.: Veggie Delite"|: 2.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni1.
"Would you like to add more vegetables? y/n"|: y.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni4.
"Would you like to add more vegetables? y/n"|: n.
"Choose a sauce:""1: Chipotle Southwest, 2: Ranch, 3: BBQ, 4: Chili, 5: Vinegar5.
"Choose a side""1: Salad"|: 1.
"Choose a drink""1: Fountain Drinks, 2: Water, 3: Coffee, 4: Tea"|: 2.
"Use choice(X) to review your meal"
true .

?- choice(X).
X = nothing ;
X = italian_wheat ;
X = six ;
X = veggie_delite ;
X = cucumbers ;
X = red_onions ;
X = vinegar ;
X = salad ;
X = water.
```

Figure 4: No meat, dairy and add-ons offered

Scenario 5 – Healthy

```

?- start().
"Would you like your meal to be healthy? y/n"y.
"Would you like your meal to be vegan? y/n"|: n.
"Would you like your meal to be value? y/n"|: n.
"Choose a sandwich option:""1: Italian Wheat, 2. Honey Oat, 3. Flatbread"|: 2.
"1: 6 inch, 2: Foot-long"|: 2.
"Choose a filling:""1: Veggie Patty, 2.: Veggie Delite, 3:Chicken Bacon Ranch, 3.
"Choose add-ons:""1: Processed Cheddar, 2: Monterey Cheddar, 3: Guacamole, 4: N4.
"Do you want more add-ons? y/n"|: n.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni1.
"Would you like to add more vegetables? y/n"|: n.
"Choose a sauce:""1: Vinegar, 2: Sweet Onion"|: 1.
"Choose a side""1: Salad"|: 1.
"Choose a drink""1: Water, 2: Coffee, 3: Tea"|: 1.
"Use choice(X) to review your meal"
true .

?- choice(X).
X = nothing ;
X = honey_oat ;
X = twelve ;
X = chicken_bacon_ranch ;
X = cucumbers ;
X = vinegar ;
X = salad ;
X = water.

```

Figure 5: Only healthy sauce, side and drink offered

Scenario 6 – Healthy and Value

```

?- start().
"Would you like your meal to be healthy? y/n"y.
"Would you like your meal to be vegan? y/n"|: n.
"Would you like your meal to be value? y/n"|: y.
"Choose a sandwich option:""1: Italian Wheat, 2. Honey Oat, 3. Flatbread"|: 3.
"1: 6 inch, 2: Foot-long"|: 2.
"Choose a filling:""1: Veggie Patty, 2.: Veggie Delite, 3:Chicken Bacon Ranch, 4.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni1.
"Would you like to add more vegetables? y/n"|: n.
"Choose a sauce:""1: Vinegar, 2: Sweet Onion"|: 1.
"Choose a side""1: Salad"|: 1.
"Choose a drink""1: Water, 2: Coffee, 3: Tea"|: 1.
"Use choice(X) to review your meal"
true .

?- choice(X).
X = nothing ;
X = flatbread ;
X = twelve ;
X = cold_cut_trio ;
X = cucumbers ;
X = vinegar ;
X = salad ;
X = water.

```

Figure 6: Only healthy sauce, side and drink offered. No add-ons offered

Scenario 7 - Healthy and Vegan

```
?- start().
"Would you like your meal to be healthy? y/n"y.
"Would you like your meal to be vegan? y/n"|: y.
"Would you like your meal to be value? y/n"|: n.
"Choose a sandwich option:""1: Italian Wheat, 2. Honey Oat, 3. Flatbread"|: 1.
"1: 6 inch, 2: Foot-long"|: 1.
"Choose a filling:""1: Veggie Patty, 2.: Veggie Delite"|: 2.
"Choose add-ons:""1: Guacamole, 2: None"|: 1.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Red Oni1.
"Would you like to add more vegetables? y/n"|: n.
"Choose a sauce:""1: Vinegar, 2: Sweet Onion"|: 2.
"Choose a side""1: Salad"|: 1.
"Choose a drink""1: Water, 2: Coffee, 3: Tea"|: 1.
"Use choice(X) to review your meal"
true .

?- choice(X).
X = nothing ;
X = italian_wheat ;
X = six ;
X = veggie_delite ;
X = guacamole ;
X = cucumbers ;
X = sweet_onion ;
X = salad ;
X = water.
```

Figure 7: Only healthy sauce, side and drink offered. No meat and dairy options offered.

Scenario 8: Value, Vegan and Healthy

```
?- start().
"Would you like your meal to be healthy? y/n"y.
"Would you like your meal to be vegan? y/n"|: y.
"Would you like your meal to be value? y/n"|: y.
"Choose a sandwich option:""1: Italian Wheat, 2. Honey Oat, 3. Flatbread"
"1: 6 inch, 2: Foot-long"|: 1.
"Choose a filling:""1: Veggie Patty, 2.: Veggie Delite"|: 2.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Re
"Would you like to add more vegetables? y/n"|: y.
"Choose vegetables:""1:Cucumbers, 2: Green Bell Peppers, 3: Lettuce, 4: Re
"Would you like to add more vegetables? y/n"|: n.
"Choose a sauce:""1: Vinegar, 2: Sweet Onion"|: 1.
"Choose a side""1: Salad"|: 1.
"Choose a drink""1: Water, 2: Coffee, 3: Tea"|: 1.
"Use choice(X) to review your meal"
true .

?- choice(X).
X = nothing ;
X = honey_oat ;
X = six ;
X = veggie_delite ;
X = cucumbers ;
X = green_bell_peppers ;
X = vinegar ;
X = salad ;
X = water.

?- ■
```

Figure 8: Only healthy sauce, side and drink offered. No meat, dairy and add-on options offered.