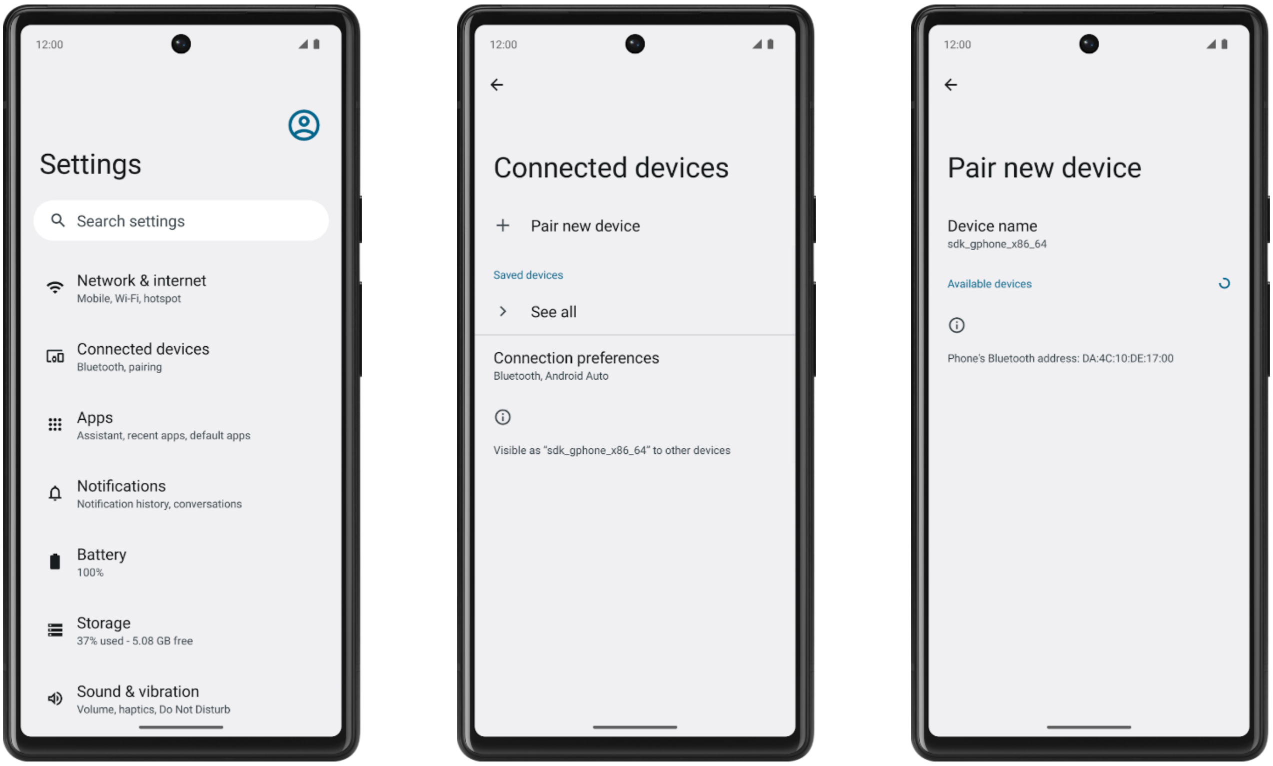
Navigate between screens with Compose

1. Before you begin

Up until this point, the apps you've worked on consisted of a single screen. However, a lot of the apps you use probably have multiple screens that you can navigate through. For example, the Settings app has many pages of content spread across different screens.



In modern Android development, multiscreen apps are created using the Jetpack Navigation component. The Navigation Compose component allows you to easily build multi screen apps in Compose using a declarative approach, just like building user interfaces. This codelab introduces the essentials of the Navigation Compose component, how to make the AppBar responsive, and how to send data from your app to another app using intents—all while demonstrating best practices in an increasingly complex app.

Prerequisites

- Familiarity with the Kotlin language, including function types, lambdas, and scope functions
- Familiarity with basic Row and Column layouts in Compose

What you'll learn

- Create a NavHost composable to define routes and screens in your app.
- Navigate between screens using a NavHostController.
- Manipulate the back stack to navigate to previous screens.
- Use intents to share data with another app.
- Customize the AppBar, including the title and back button.

What you'll build

- You'll implement navigation in a multiscreen app.

What you'll need

- The latest version of Android Studio
- An internet connection to download the starter code

2. Download starter code

To get started, download the starter code:

https://github.com/google-developer-training/basic-android-kotlin-compose-training-cupcake/archive/refs/heads/starter.zip

Alternatively, you can clone the GitHub repository for the code:

```
$ git clone https://github.com/google-developer-training/basic-android-kotlin-compose-training-cupcake.git
$ cd basic-android-kotlin-compose-training-cupcake
$ git checkout starter
```

Note: The starter code is in the starter branch of the downloaded repository.

If you want to see the starter code for this codelab, view it on:

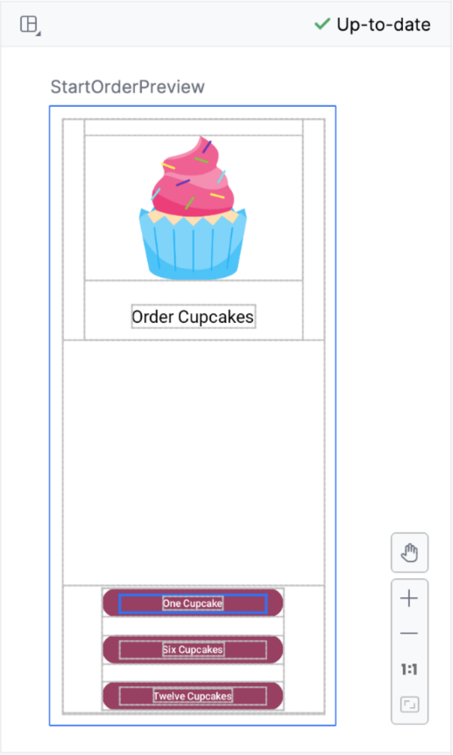
https://github.com/google-developer-training/basic-android-kotlin-compose-training-cupcake/tree/starter

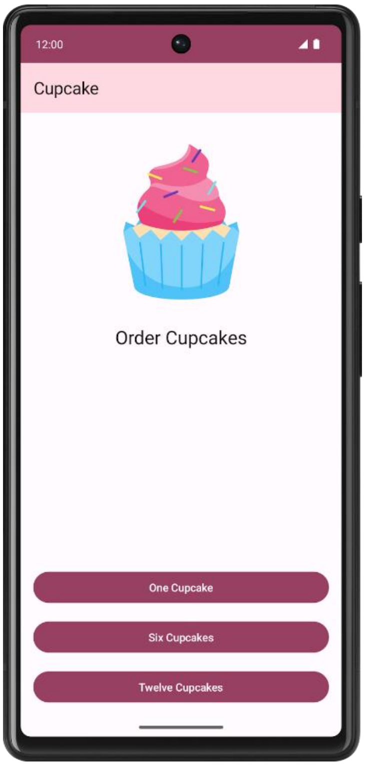
3. App walkthrough

The Cupcake app is a bit different than the apps you've worked with so far. Instead of all the content displaying on a single screen, the app has four separate screens, and the user can navigate through each screen while ordering cupcakes. If you run the app, you won't see anything and you won't be able to navigate between these screens since the navigation component is not added to the app code yet. However, you can still check the composable previews for each screen and match them with the final app screens below.

Start order screen

The first screen presents the user with three buttons that correspond to the quantity of cupcakes to order.



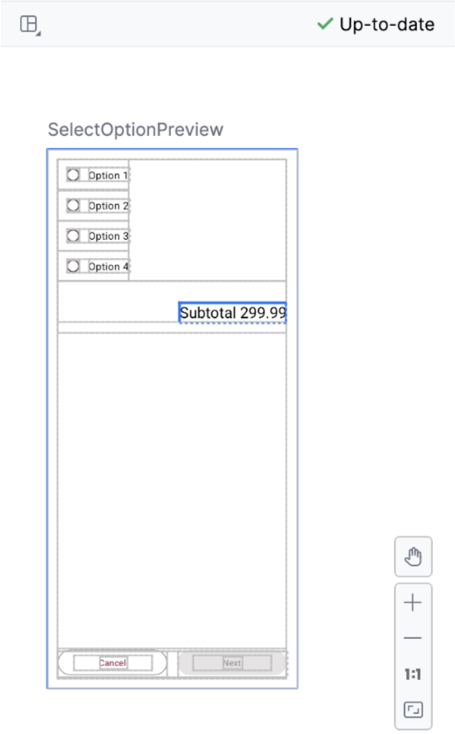


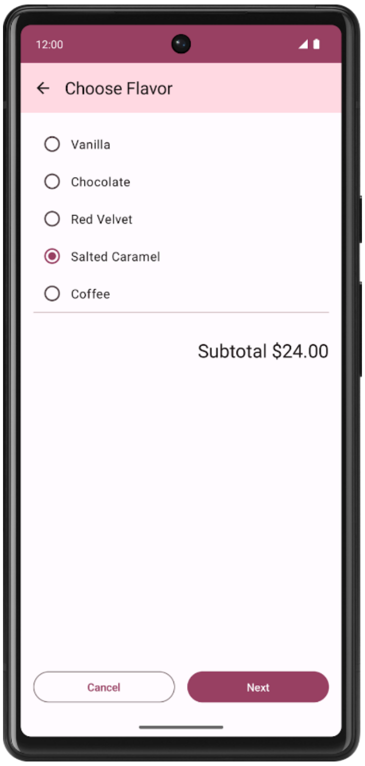
In code, this is represented by the `StartOrderScreen` composable in `StartOrderScreen.kt`.

The screen consists of a single column, with an image and text, along with three custom buttons to order different quantities of cupcakes. The custom buttons are implemented by the `SelectQuantityButton` composable, which is also in `StartOrderScreen.kt`.

Choose flavor screen

After selecting the quantity, the app prompts the user to select a cupcake flavor. The app uses what's known as *radio buttons* to display different options. Users can select one flavor out of a choice of possible flavors.

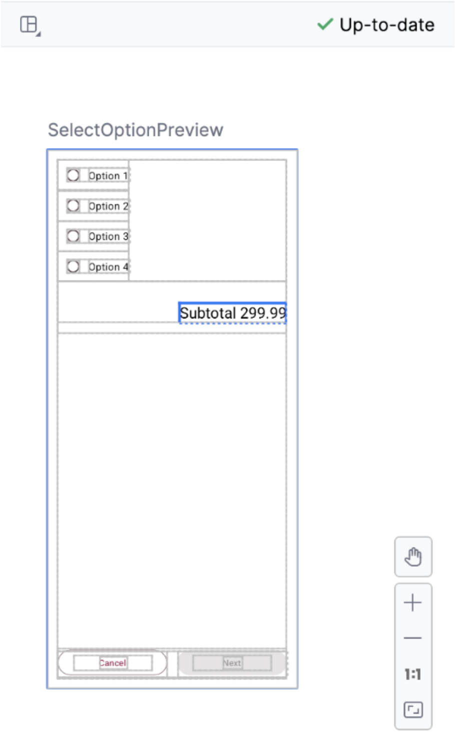


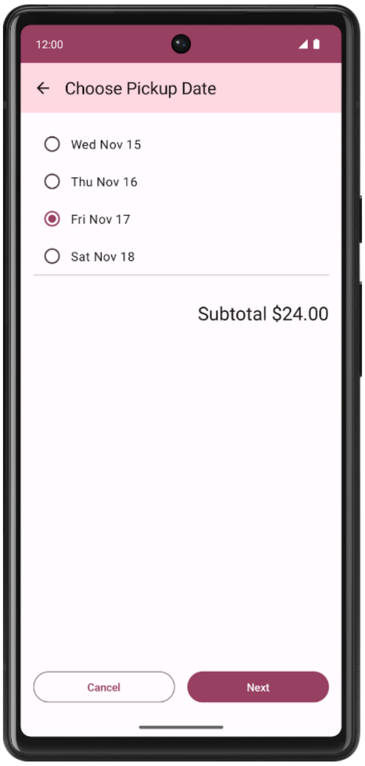


The list of possible flavors is stored as a list of string resource IDs in `data.DataSource.kt`.

Choose pickup date screen

After choosing a flavor, the app presents users with another series of radio buttons to select a pickup date. Pickup options come from a list returned by the `pickupOptions()` function in `OrderViewModel`.





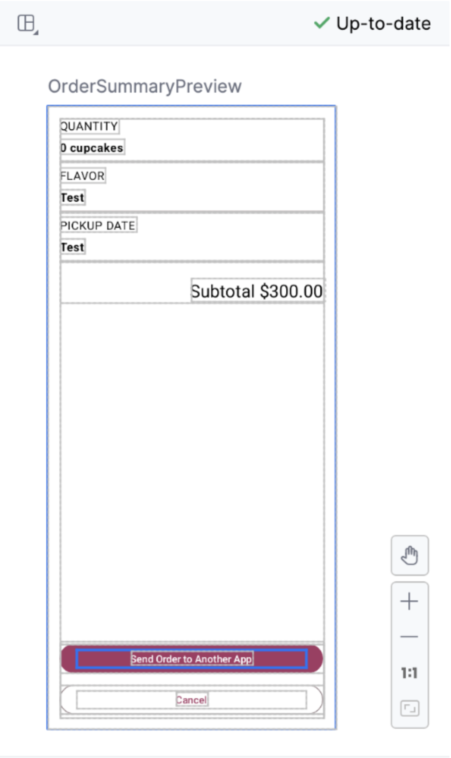
○ Wed Nov 15
○ Thu Nov 16
● Fri Nov 17
○ Sat Nov 18

Subtotal $24.00

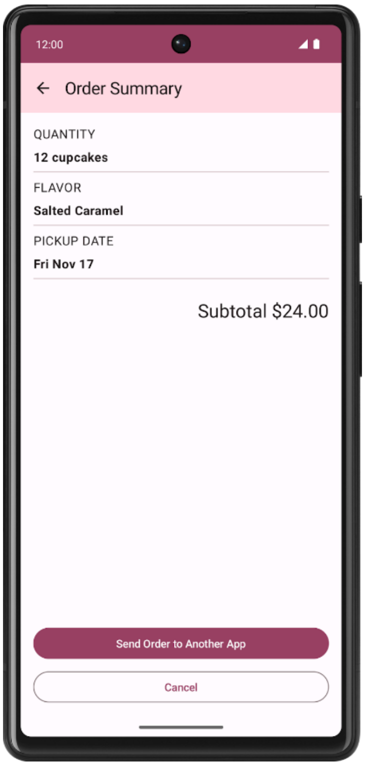
Both the **Choose Flavor** screen and **Choose Pickup Date** screen are represented by the same composable, `SelectOptionScreen` in `SelectOptionScreen.kt`. Why use the same composable? The layout of these screens is exactly the same! The only difference is the data, but you can use the same composable to display both the flavor and pickup date screens.

Order Summary screen

After selecting the pickup date, the app displays the **Order Summary** screen where the user can review and complete the order.



QUANTITY
0 cupcakes
FLAVOR
Test
PICKUP DATE
Test
Subtotal $300.00

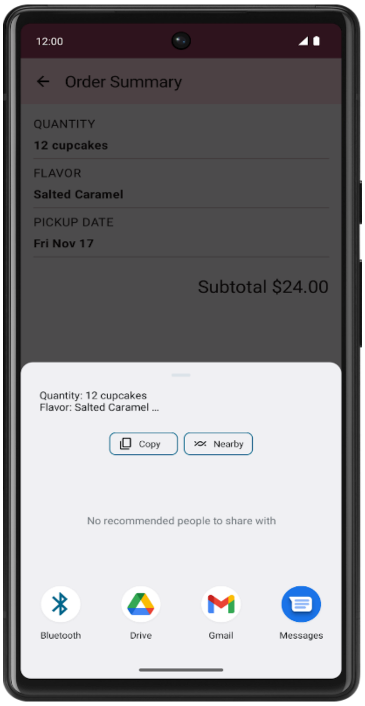


QUANTITY
12 cupcakes
FLAVOR
Salted Caramel
PICKUP DATE
Fri Nov 17
Subtotal $24.00

This screen is implemented by the `OrderSummaryScreen` composable in `SummaryScreen.kt`.

The layout consists of a `Column` containing all the information about their order, a `Text` composable for the subtotal, and buttons to either send the order to another app or cancel the order and return to the first screen.

If users choose to send the order to another app, the Cupcake app displays an Android ShareSheet (https://developer.android.com/training/sharing/send#why-to-use-system-sharesheet) that shows different sharing options.



QUANTITY
12 cupcakes

FLAVOR
Salted Caramel

PICKUP DATE
Fri Nov 17

Subtotal $24.00

Quantity: 12 cupcakes
Flavor: Salted Caramel ...

No recommended people to share with

The current state of the app is stored in data.OrderUiState.kt. The OrderUiState data class contains properties to store the user's selections from each screen.

The screens of the app will be presented in the CupcakeApp composable. However, in the starter project, the app simply shows the first screen. It's not currently possible to navigate through all the screens of the app, but don't worry, that's what you're here for! You'll learn how to define navigation routes, set up a NavHost composable to navigate between screens—also known as destinations—perform intents to integrate with system UI components like the share screen, and make the AppBar respond to navigation changes.

Reusable composables

Where appropriate, the sample apps in this course are designed to implement best practices. The Cupcake app is no exception. In the **ui.components** package, you'll see a file named CommonUi.kt that contains a FormattedPriceLabel composable. Multiple screens in the app use this composable to format the order price consistently. Rather than duplicate the same Text composable with the same formatting and modifiers, you can define FormattedPriceLabel once and then reuse it as many times as needed for other screens.

The flavor and pickup date screens use the SelectOptionScreen composable, which is also reusable. This composable takes a parameter named options of the type List<String> that represents the options to display. The options appear in a Row, consisting of a RadioButton composable and a Text composable containing each string. A Column surrounds the entire layout and also contains a Text composable to show the formatted price, a **Cancel** button, and a **Next** button.

4. Define routes and create a NavHostController

Parts of the Navigation Component

The Navigation component has three main parts:

- **NavController**: Responsible for navigating between destinations—that is, the screens in your app.
- **NavGraph**: Maps composable destinations to navigate to.
- **NavHost**: Composable acting as a container for displaying the current destination of the NavGraph.

In this codelab, you'll focus on the NavController and the NavHost. Within the NavHost, you'll define the destinations for the Cupcake app's NavGraph.

Define routes for destinations in your app

One of the fundamental concepts of navigation in a Compose app is the route. A route is a string that corresponds to a destination. This idea is similar to the concept of a URL. Just as a different URL maps to a different page on a website, a route is a string that maps to a destination and serves as its unique identifier. A destination is typically a single Composable or group of Composables corresponding to what the user sees. The Cupcake app needs destinations for the start order screen, the flavor screen, the pickup date screen, and the order summary screen.

There are a finite number of screens in an app, so there are also a finite number of routes. You can define an app's routes using an enum class. Enum classes in Kotlin have a name property that returns a string with the property name.

You'll start by defining the four routes of the Cupcake app.

- Start: Select the quantity of cupcakes from one of three buttons.
- Flavor: Select the flavor from a list of choices.
- Pickup: Select the pickup date from a list of choices.
- Summary: Review the selections and either send or cancel the order.

Add an enum class to define the routes.

1. In CupcakeScreen.kt, above the CupcakeAppBar composable, add an enum class named CupcakeScreen.

```
enum class CupcakeScreen() {

}
```

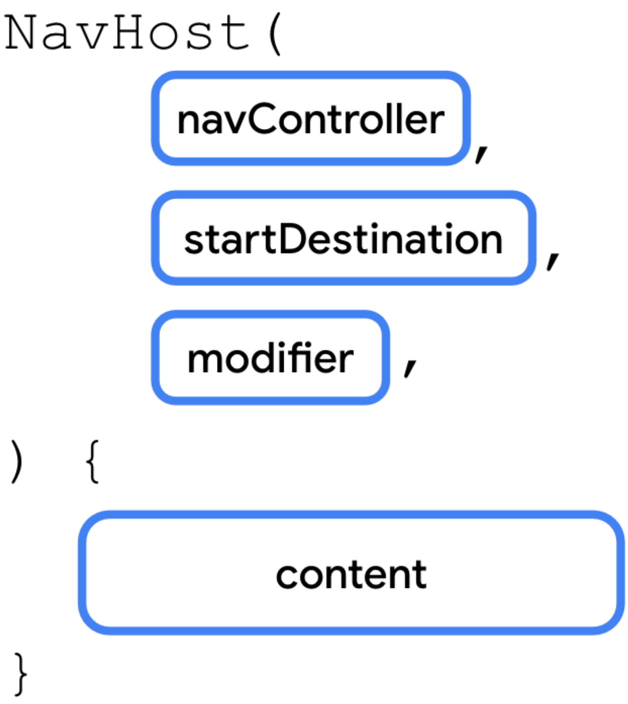
2. Add four cases to the enum class: `Start`, `Flavor`, `Pickup`, and `Summary`.

```
enum class CupcakeScreen() {
    Start,
    Flavor,
    Pickup,
    Summary
}
```

Add a NavHost to your app

A NavHost is a Composable that displays other composable destinations, based on a given route. For example, if the route is `Flavor`, then the `NavHost` would show the screen to choose the cupcake flavor. If the route is `Summary`, then the app displays the summary screen.

The syntax for `NavHost` is just like any other Composable.



There are two notable parameters.

- `navController`: An instance of the `NavHostController` class. You can use this object to navigate between screens, for example, by calling the `navigate()` method to navigate to another destination. You can obtain the `NavHostController` by calling `rememberNavController()` from a composable function.

- `startDestination`: A string route defining the destination shown by default when the app first displays the `NavHost`. In the case of the Cupcake app, this should be the `Start` route.

Like other composables, `NavHost` also takes a `modifier` parameter.

Note: NavHostController is a subclass of the NavController class that provides additional functionality for use with a NavHost composable.

You'll add a `NavHost` to the `CupcakeApp` composable in `CupcakeScreen.kt`. First, you need a reference to the navigation controller. You can use the navigation controller in both the `NavHost` you're adding now and the `AppBar` you'll add in a later step. Therefore, you should declare the variable in the `CupcakeApp()` composable.

1. Open `CupcakeScreen.kt`.
2. Within the `Scaffold`, below the `uiState` variable, add a `NavHost` composable.

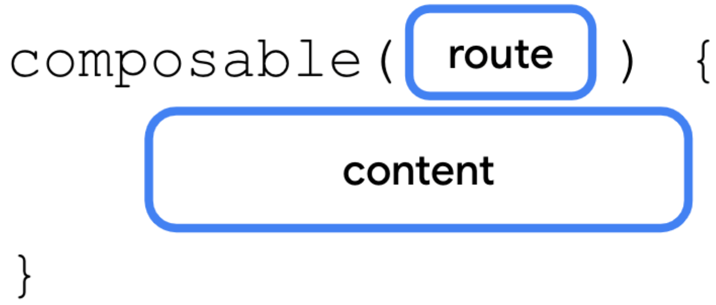
```
import androidx.navigation.compose.NavHost

Scaffold(
    ...
) { innerPadding ->
    val uiState by viewModel.uiState.collectAsState()

    NavHost()
}
```

3. Pass in the `navController` variable for the `navController` parameter and `CupcakeScreen.Start.name` for the `startDestination` parameter. Pass the modifier that was passed into `CupcakeApp()` for the modifier parameter. Pass in an empty trailing lambda for the final parameter.

```
import androidx.compose.foundation.layout.padding

NavHost(
    navController = navController,
    startDestination = CupcakeScreen.Start.name,
    modifier = Modifier.padding(innerPadding)
) {

}
```

Handle routes in your NavHost

Like other composables, `NavHost` takes a function type for its content.



Within the content function of a `NavHost`, you call the `composable()` function. The `composable()` function has two required parameters.

- `route`: A string corresponding to the name of a route. This can be any unique string. You'll use the name property of the `CupcakeScreen` enum's constants.
- `content`: Here you can call a composable that you want to display for the given route.

You'll call the `composable()` function once for each of the four routes.

Note: The composable() function is an extension function of NavGraphBuilder.

1. Call the `composable()` function, passing in `CupcakeScreen.Start.name` for the `route`.

```
import androidx.navigation.compose.composable

NavHost(
    navController = navController,
    startDestination = CupcakeScreen.Start.name,
    modifier = Modifier.padding(innerPadding)
) {
    composable(route = CupcakeScreen.Start.name) {

    }
}
```

2. Within the trailing lambda, call the `StartOrderScreen` composable, passing in `quantityOptions` for the `quantityOptions` property. For the `modifier` pass in `Modifier.fillMaxSize().padding(dimensionResource(R.dimen.padding_medium))`

```
import androidx.compose.foundation.layout.fillMaxSize
import androidx.compose.ui.res.dimensionResource
import com.example.cupcake.ui.StartOrderScreen
import com.example.cupcake.data.DataSource

NavHost(
    navController = navController,
    startDestination = CupcakeScreen.Start.name,
    modifier = Modifier.padding(innerPadding)
) {
    composable(route = CupcakeScreen.Start.name) {
        StartOrderScreen(
            quantityOptions = DataSource.quantityOptions,
            modifier = Modifier
                .fillMaxSize()
                .padding(dimensionResource(R.dimen.padding_med
ium))
        )
    }
}
```

Note: The quantityOptions property comes from the DataSource singleton object in DataSource.kt.

3. Below the first call to `composable()`, call `composable()` again, passing in `CupcakeScreen.Flavor.name` for the `route`.

```
composable(route = CupcakeScreen.Flavor.name) {

}
```

4. Within the trailing lambda, get a reference to `LocalContext.current` and store it in a variable named `context`. `Context` is an abstract class whose implementation is provided by the Android system. It allows access to application-specific resources and classes, as well as up-calls for application-level operations such as launching activities, etc. You can use this variable to get the strings from the list of resource IDs in the view model to display the list of flavors.

```
import androidx.compose.ui.platform.LocalContext

composable(route = CupcakeScreen.Flavor.name) {
    val context = LocalContext.current
}
```

5. Call the `SelectOptionScreen` composable.

```
composable(route = CupcakeScreen.Flavor.name) {
    val context = LocalContext.current
    SelectOptionScreen(

    )
}
```

6. The flavor screen needs to display and update the subtotal when the user selects a flavor. Pass in `uiState.price` for the `subtotal` parameter.

```
composable(route = CupcakeScreen.Flavor.name) {
    val context = LocalContext.current
    SelectOptionScreen(
        subtotal = uiState.price
    )
}
```

7. The flavor screen gets the list of flavors from the app's string resources. Transform the list of resource IDs into a list of strings using the `map()` function and calling `context.resources.getString(id)` for each flavor.

```
import com.example.cupcake.ui.SelectOptionScreen

composable(route = CupcakeScreen.Flavor.name) {
    val context = LocalContext.current
    SelectOptionScreen(
        subtotal = uiState.price,
        options = DataSource.flavors.map { id ->
context.resources.getString(id) }
    )
}
```

8. For the `onSelectionChanged` parameter, pass in a lambda expression that calls `setFlavor()` on the view model, passing in `it` (the argument passed into `onSelectionChanged()`). For the modifier parameter, pass in `Modifier.fillMaxHeight()`.

```
import androidx.compose.foundation.layout.fillMaxHeight
import com.example.cupcake.data.DataSource.flavors

composable(route = CupcakeScreen.Flavor.name) {
    val context = LocalContext.current
    SelectOptionScreen(
        subtotal = uiState.price,
        options = DataSource.flavors.map { id ->
context.resources.getString(id) },
        onSelectionChanged = { viewModel.setFlavor(it) },
        modifier = Modifier.fillMaxHeight()
    )
}
```

The pickup date screen. is similar to the flavor screen. The only difference is the data passed into the `SelectOptionScreen` composable.

9. Call the `composable()` function again, passing in `CupcakeScreen.Pickup.name` for the `route` parameter.

```
composable(route = CupcakeScreen.Pickup.name) {

}
```

10. In the trailing lambda, call the `SelectOptionScreen` composable and pass in `uiState.price` for the `subtotal`, as before. Pass in `uiState.pickupOptions` for the `options` parameter and a lambda expression that calls `setDate()` on the `viewModel` for the `onSelectionChanged` parameter. For the `modifier` parameter, pass in `Modifier.fillMaxHeight()`.

```
SelectOptionScreen(
    subtotal = uiState.price,
    options = uiState.pickupOptions,
    onSelectionChanged = { viewModel.setDate(it) },
    modifier = Modifier.fillMaxHeight()
)
```

11. Call `composable()` one more time, passing in `CupcakeScreen.Summary.name` for the `route`.

```
composable(route = CupcakeScreen.Summary.name) {

}
```

12. In the trailing lambda, call the `OrderSummaryScreen()` composable, passing in the `uiState` variable for the `orderUiState` parameter. For the `modifier` parameter, pass in `Modifier.fillMaxHeight()`.

```
import com.example.cupcake.ui.OrderSummaryScreen

composable(route = CupcakeScreen.Summary.name) {
    OrderSummaryScreen(
        orderUiState = uiState,
        modifier = Modifier.fillMaxHeight()
    )
}
```

That's it for setting up the `NavHost`. In the next section, you'll make your app change routes and navigate between screens when the user taps each of the buttons.

5. Navigate between routes

Now that you've defined your routes and mapped them to composables in a `NavHost`, it's time to navigate between screens. The `NavHostController`—the `navController` property from calling `rememberNavController()`—is responsible for navigating between routes. Notice, however, that this property is defined in the `CupcakeApp` composable. You need a way to access it from the different screens in your app.

Easy, right? Just pass the `navController` as a parameter to each of the composables.

While this approach works, it's not an ideal way to architect your app. A benefit of using a NavHost to handle your app's navigation is that navigation logic is kept separate from individual UI. This option avoids some of the major drawbacks of passing the `navController` as a parameter.

- Navigation logic is kept in one place, which can make your code easier to maintain and prevent bugs by not accidentally giving individual screens free reign of navigation in your app.
- In apps that need to work on different form factors (like portrait mode phone, foldable phone, or large screen tablet), a button may or may not trigger navigation, depending on the app's layout. Individual screens should be self-contained and don't need to be aware of other screens in the app.

Instead, our approach is to pass a function type into each composable for what should happen when a user clicks the button. That way, the composable and any of its child composables decide when to call the function. However, navigation logic isn't exposed to the individual screens in your app. All the navigation behavior is handled in the NavHost.

Add button handlers to StartOrderScreen

You'll start by adding a function type parameter that is called when one of the quantity buttons is pressed on the first screen. This function is passed into the StartOrderScreen composable and is responsible for updating the viewmodel and navigating to the next screen.

1. Open `StartOrderScreen.kt`.

2. Below the `quantityOptions` parameter, and before the modifier parameter, add a parameter named `onNextButtonClicked` of type `() -> Unit`.

```
@Composable
fun StartOrderScreen(
    quantityOptions: List<Pair<Int, Int>>,
    onNextButtonClicked: () -> Unit,
    modifier: Modifier = Modifier
){
    ...
}
```

3. Now that the `StartOrderScreen` composable expects a value for `onNextButtonClicked`, find the `StartOrderPreview` and pass an empty lambda body to the `onNextButtonClicked` parameter.

```
@Preview
@Composable
fun StartOrderPreview() {
    CupcakeTheme {
        StartOrderScreen(
            quantityOptions = DataSource.quantityOptions,
            onNextButtonClicked = {},
            modifier = Modifier
                .fillMaxSize()
                .padding(dimensionResource(R.dimen.padding_med
ium))
        )
    }
}
```

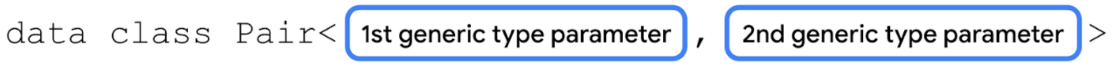
Each button corresponds to a different quantity of cupcakes. You'll need this information so that the function passed in for `onNextButtonClicked` can update the viewmodel accordingly.

4. Modify the onNextButtonClicked parameter's type to take an Int parameter.

```
onNextButtonClicked: (Int) -> Unit,
```

To get the `Int` to pass in when calling `onNextButtonClicked()`, take a look at the type of `quantityOptions` parameter.

The type is `List<Pair<Int, Int>>` or a list of `Pair<Int, Int>`. The `Pair` type may be unfamiliar to you, but it's just as the name suggests, a pair of values. `Pair` takes two generic type parameters. In this case, they're both of type `Int`.



data class Pair< 1st generic type parameter , 2nd generic type parameter >

Each item in a pair is accessed by either the first property or second property. In the case of the StartOrderScreen composable's quantityOptions parameter, the first Int is a resource ID for the string to display on each button. The second Int is the actual quantity of cupcakes.

We'll pass the second property of the selected pair when calling the onNextButtonClicked() function.

1. Find the empty lambda expression for the onClick parameter of the SelectQuantityButton.

```
quantityOptions.forEach { item ->
    SelectQuantityButton(
        labelResourceId = item.first,
        onClick = {}
    )
}
```

2. Within the lambda expression, call onNextButtonClicked, passing in item.second—the number of cupcakes.

```
quantityOptions.forEach { item ->
    SelectQuantityButton(
        labelResourceId = item.first,
        onClick = { onNextButtonClicked(item.second) }
    )
}
```

Add button handlers to SelectOptionScreen

1. Below the onSelectionChanged parameter of the SelectOptionScreen composable in SelectOptionScreen.kt, add a parameter named onCancelButtonClicked of type () -> Unit with a default value of {}.

```
@Composable
fun SelectOptionScreen(
    subtotal: String,
    options: List<String>,
    onSelectionChanged: (String) -> Unit = {},
    onCancelButtonClicked: () -> Unit = {},
    modifier: Modifier = Modifier
)
```

2. Below the `onCancelButtonClicked` parameter, add another parameter of type `() -> Unit` named `onNextButtonClicked` with a default value of `{}`.

```
@Composable
fun SelectOptionScreen(
    subtotal: String,
    options: List<String>,
    onSelectionChanged: (String) -> Unit = {},
    onCancelButtonClicked: () -> Unit = {},
    onNextButtonClicked: () -> Unit = {},
    modifier: Modifier = Modifier
)
```

3. Pass in `onCancelButtonClicked` for the cancel button's `onClick` parameter.

```
OutlinedButton(
    modifier = Modifier.weight(1f),
    onClick = onCancelButtonClicked
) {
    Text(stringResource(R.string.cancel))
}
```

4. Pass in `onNextButtonClicked` for the next button's `onClick` parameter.

```
Button(
    modifier = Modifier.weight(1f),
    enabled = selectedValue.isNotEmpty(),
    onClick = onNextButtonClicked
) {
    Text(stringResource(R.string.next))
}
```

Add button handlers to SummaryScreen

Finally, add button handler functions for the **Cancel** and **Send** buttons on the summary screen.

1. In the `OrderSummaryScreen` composable in `SummaryScreen.kt`, add a parameter named `onCancelButtonClicked` of type `() -> Unit`.

```
@Composable
fun OrderSummaryScreen(
    orderUiState: OrderUiState,
    onCancelButtonClicked: () -> Unit,
    modifier: Modifier = Modifier
){
    ...
}
```

2. Add another parameter of type (String, String) -> Unit and name this one onSendButtonClicked.

```
@Composable
fun OrderSummaryScreen(
    orderUiState: OrderUiState,
    onCancelButtonClicked: () -> Unit,
    onSendButtonClicked: (String, String) -> Unit,
    modifier: Modifier = Modifier
){
    ...
}
```

3. The OrderSummaryScreen composable now expects values for onSendButtonClicked and onCancelButtonClicked. Find the OrderSummaryPreview, pass an empty lambda body with two String parameters to onSendButtonClicked and an empty lambda body to the onCancelButtonClicked parameters.

```
@Preview
@Composable
fun OrderSummaryPreview() {
   CupcakeTheme {
       OrderSummaryScreen(
           orderUiState = OrderUiState(0, "Test", "Test",
"$300.00"),
           onSendButtonClicked = { subject: String, summary:
String -> },
           onCancelButtonClicked = {},
           modifier = Modifier.fillMaxHeight()
       )
   }
}
```

4. Pass onSendButtonClicked for the onClick parameter of the **Send** button. Pass in newOrder and orderSummary, the two variables defined earlier in OrderSummaryScreen. These strings consist of the actual data that the user can share with another app.

```
Button(
    modifier = Modifier.fillMaxWidth(),
    onClick = { onSendButtonClicked(newOrder, orderSummary) }
) {
    Text(stringResource(R.string.send))
}
```

5. Pass `onCancelButtonClicked` for the `onClick` parameter of the **Cancel** button.

```
OutlinedButton(
    modifier = Modifier.fillMaxWidth(),
    onClick = onCancelButtonClicked
) {
    Text(stringResource(R.string.cancel))
}
```

Navigate to another route

To navigate to another route, simply call the `navigate()` method on your instance of `NavHostController`.

```
navController.navigate( route )
```

The navigate method takes a single parameter: a `String` corresponding to a route defined in your `NavHost`. If the route matches one of the calls to `composable()` in the NavHost, the app then navigates to that screen.

You'll pass in functions that call `navigate()` when the user presses buttons on the `Start`, `Flavor`, and `Pickup` screens.

1. In `CupcakeScreen.kt`, find the call to `composable()` for the start screen. For the `onNextButtonClicked` parameter, pass in a lambda expression.

```
StartOrderScreen(
    quantityOptions = DataSource.quantityOptions,
    onNextButtonClicked = {
    }
)
```

Remember the `Int` property passed into this function for the number of cupcakes? Before navigating to the next screen, you should update the view model so that the app displays the correct subtotal.

2. Call `setQuantity` on the `viewModel`, passing in `it`.

```
onNextButtonClicked = {
    viewModel.setQuantity(it)
}
```

3. Call navigate() on the navController, passing in CupcakeScreen.Flavor.name for the route.

```
onNextButtonClicked = {
    viewModel.setQuantity(it)
    navController.navigate(CupcakeScreen.Flavor.name)
}
```

4. For the onNextButtonClicked parameter on the flavor screen, simply pass in a lambda that calls navigate(), passing in CupcakeScreen.Pickup.name for the route.

```
composable(route = CupcakeScreen.Flavor.name) {
    val context = LocalContext.current
    SelectOptionScreen(
        subtotal = uiState.price,
        onNextButtonClicked = {
navController.navigate(CupcakeScreen.Pickup.name) },
        options = DataSource.flavors.map { id ->
context.resources.getString(id) },
        onSelectionChanged = { viewModel.setFlavor(it) },
        modifier = Modifier.fillMaxHeight()
    )
}
```

5. Pass in an empty lambda for onCancelButtonClicked, which you implement next.

```
SelectOptionScreen(
    subtotal = uiState.price,
    onNextButtonClicked = {
navController.navigate(CupcakeScreen.Pickup.name) },
    onCancelButtonClicked = {},
    options = DataSource.flavors.map { id ->
context.resources.getString(id) },
    onSelectionChanged = { viewModel.setFlavor(it) },
    modifier = Modifier.fillMaxHeight()
)
```

6. For the onNextButtonClicked parameter on the pickup screen, pass in a lambda that calls navigate(), passing in CupcakeScreen.Summary.name for the route.

```
composable(route = CupcakeScreen.Pickup.name) {
    SelectOptionScreen(
        subtotal = uiState.price,
        onNextButtonClicked = {
```

```
navController.navigate(CupcakeScreen.Summary.name) },
        options = uiState.pickupOptions,
        onSelectionChanged = { viewModel.setDate(it) },
        modifier = Modifier.fillMaxHeight()
    )
}
```

7. Again, pass in an empty lambda for `onCancelButtonClicked()`.

```
SelectOptionScreen(
    subtotal = uiState.price,
    onNextButtonClicked = {
navController.navigate(CupcakeScreen.Summary.name) },
    onCancelButtonClicked = {},
    options = uiState.pickupOptions,
    onSelectionChanged = { viewModel.setDate(it) },
    modifier = Modifier.fillMaxHeight()
)
```

8. For the `OrderSummaryScreen`, pass in empty lambdas for `onCancelButtonClicked` and `onSendButtonClicked`. Add parameters for the `subject` and `summary` that are passed into `onSendButtonClicked`, which you will implement soon.

```
composable(route = CupcakeScreen.Summary.name) {
    OrderSummaryScreen(
        orderUiState = uiState,
        onCancelButtonClicked = {},
        onSendButtonClicked = { subject: String, summary:
String ->

        },
        modifier = Modifier.fillMaxHeight()
    )
}
```

You should now be able to navigate through each screen of your app. Notice that by calling `navigate()`, not only does the screen change, but it's actually placed on top of the back stack. Also, when you press the system back button, you can navigate back to the previous screen.

The app stacks each screen on top of the previous one, and the back button (◀) can remove them. The history of screens from the `startDestination` at the bottom to the topmost screen that was just shown is known as the back stack.

Pop to the start screen

Unlike the system back button, the **Cancel** button doesn't go back to the previous screen. Instead, it should pop—remove—all screens from the back stack and return to the starting screen.

You can do this by calling the `popBackStack()` method.

```
navController.popBackStack(route, inclusive)
```

The `popBackStack()` method has two required parameters.

- `route`: The string representing the route of the destination you want to navigate back to.
- `inclusive`: A Boolean value that, if true, also pops (removes) the specified route. If false, `popBackStack()` will remove all destinations on top of—but not including—the start destination, leaving it as the topmost screen visible to the user.

When users press the **Cancel** button on any of the screens, the app resets the state in the view model and calls `popBackStack()`. You'll first implement a method to do this and then pass it in for the appropriate parameter on all three screens with **Cancel** buttons.

1. After the `CupcakeApp()` function, define a private function called `cancelOrderAndNavigateToStart()`.

```
private fun cancelOrderAndNavigateToStart() {
}
```

2. Add two parameters: `viewModel` of type `OrderViewModel`, and `navController` of type `NavHostController`.

```
private fun cancelOrderAndNavigateToStart(
    viewModel: OrderViewModel,
    navController: NavHostController
) {
}
```

3. In the function body, call `resetOrder()` on the `viewModel`.

```
private fun cancelOrderAndNavigateToStart(
    viewModel: OrderViewModel,
    navController: NavHostController
) {
    viewModel.resetOrder()
}
```

4. Call `popBackStack()` on the `navController`, passing in `CupcakeScreen.Start.name` for the `route`, and `false` for `inclusive`.

```
private fun cancelOrderAndNavigateToStart(
    viewModel: OrderViewModel,
    navController: NavHostController
) {
    viewModel.resetOrder()
    navController.popBackStack(CupcakeScreen.Start.name,
inclusive = false)
}
```

5. In the `CupcakeApp()` composable, pass `cancelOrderAndNavigateToStart` in for the `onCancelButtonClicked` parameters of the two `SelectOptionScreen` composables and the `OrderSummaryScreen` composable.

```
composable(route = CupcakeScreen.Start.name) {
    StartOrderScreen(
        quantityOptions = DataSource.quantityOptions,
        onNextButtonClicked = {
            viewModel.setQuantity(it)
            navController.navigate(CupcakeScreen.Flavor.name)
        },
        modifier = Modifier
            .fillMaxSize()
            .padding(dimensionResource(R.dimen.padding_medium)
)
    )
}
composable(route = CupcakeScreen.Flavor.name) {
    val context = LocalContext.current
    SelectOptionScreen(
        subtotal = uiState.price,
        onNextButtonClicked = {
navController.navigate(CupcakeScreen.Pickup.name) },
        onCancelButtonClicked = {
            cancelOrderAndNavigateToStart(viewModel,
navController)
        },
        options = DataSource.flavors.map { id ->
context.resources.getString(id) },
        onSelectionChanged = { viewModel.setFlavor(it) },
        modifier = Modifier.fillMaxHeight()
    )
}
```

```
composable(route = CupcakeScreen.Pickup.name) {
    SelectOptionScreen(
        subtotal = uiState.price,
        onNextButtonClicked = {
navController.navigate(CupcakeScreen.Summary.name) },
        onCancelButtonClicked = {
            cancelOrderAndNavigateToStart(viewModel,
navController)
        },
        options = uiState.pickupOptions,
        onSelectionChanged = { viewModel.setDate(it) },
        modifier = Modifier.fillMaxHeight()
    )
}
composable(route = CupcakeScreen.Summary.name) {
    OrderSummaryScreen(
        orderUiState = uiState,
        onCancelButtonClicked = {
            cancelOrderAndNavigateToStart(viewModel,
navController)
        },
        onSendButtonClicked = { subject: String, summary:
String ->

        },
        modifier = Modifier.fillMaxHeight()
   )
}
```

Run your app and test that pressing the **Cancel** button on any of the screens navigates the user back to the first screen.

6. Navigate to another app

So far, you've learned how to navigate to a different screen in your app and how to navigate back to the home screen. There's just one other step to implement navigation in the Cupcake app. On the order summary screen, the user can send their order to another app. This selection brings up a ShareSheet—a user interface component that covers the bottom part of the screen—that shows sharing options.

This piece of UI isn't part of the Cupcake app. In fact, it's provided by the Android operating system. System UI, such as the sharing screen, isn't called by your `navController`. Instead, you use something called an Intent.

An intent is a request for the system to perform some action, commonly presenting a new activity. There are many different intents, and you're encouraged to refer to the documentation for a comprehensive list. However, we are interested in the one called

`ACTION_SEND`. You can supply this intent with some data, such as a string, and present appropriate sharing actions for that data.

The basic process for setting up an intent is as follows:

1. Create an intent object and specify the intent, such as `ACTION_SEND`.
2. Specify the type of additional data being sent with the intent. For a simple piece of text, you can use `"text/plain"`, though other types, such as `"image/*"` or `"video/*"`, are available.
3. Pass any additional data to the intent, such as the text or image to share, by calling the `putExtra()` method. This intent will take two extras: `EXTRA_SUBJECT` and `EXTRA_TEXT`.
4. Call the `startActivity()` method of context, passing in an activity created from the intent.

We'll walk you through how to create the share action intent, but the process is the same for other types of intents. For future projects, you're encouraged to refer to the documentation as needed for the specific type of data and necessary extras.

Complete the following steps to create an intent to send the cupcake order to another app:

1. In `CupcakeScreen.kt`, below the `CupcakeApp` composable, create a private function named `shareOrder().`

```
private fun shareOrder()
```

2. Add a parameter named `context` of type `Context`.

```
import android.content.Context

private fun shareOrder(context: Context) {
}
```

3. Add two `String` parameters: `subject` and `summary`. These strings will be shown on the sharing action sheet.

```
private fun shareOrder(context: Context, subject: String,
summary: String) {
}
```

4. Within the function's body, create an Intent named `intent`, and pass `Intent.ACTION_SEND` as an argument.

```
import android.content.Intent

val intent = Intent(Intent.ACTION_SEND)
```

Since you only need to configure this `Intent` object once, you can make the next few lines of code more concise using the `apply()` function, which you learned about in an earlier codelab.

5. Call `apply()` on the newly created Intent and pass in a lambda expression.

```
val intent = Intent(Intent.ACTION_SEND).apply {

}
```

6. In the lambda body, set the type to `"text/plain"`. Because you're doing this in a function passed into `apply()`, you don't need to refer to the object's identifier, `intent`.

```
val intent = Intent(Intent.ACTION_SEND).apply {
    type = "text/plain"
}
```

7. Call `putExtra()`, passing in subject for `EXTRA_SUBJECT`.

```
val intent = Intent(Intent.ACTION_SEND).apply {
    type = "text/plain"
    putExtra(Intent.EXTRA_SUBJECT, subject)
}
```

8. Call `putExtra()`, passing in summary for `EXTRA_TEXT`.

```
val intent = Intent(Intent.ACTION_SEND).apply {
    type = "text/plain"
    putExtra(Intent.EXTRA_SUBJECT, subject)
    putExtra(Intent.EXTRA_TEXT, summary)
}
```

9. Call `startActivity()` method of context.

```
context.startActivity(

)
```

10. Within the lambda passed into `startActivity()`, create an activity from the Intent by calling the class method `createChooser()`. Pass intent for the first argument and the `new_cupcake_order` string resource.

```
context.startActivity(
    Intent.createChooser(
        intent,
        context.getString(R.string.new_cupcake_order)
    )
)
```

11. In the `CupcakeApp` composable, in the call to `composable()` for the `CucpakeScreen.Summary.name`, get a reference to the context object so that you can pass it to the `shareOrder()` function.

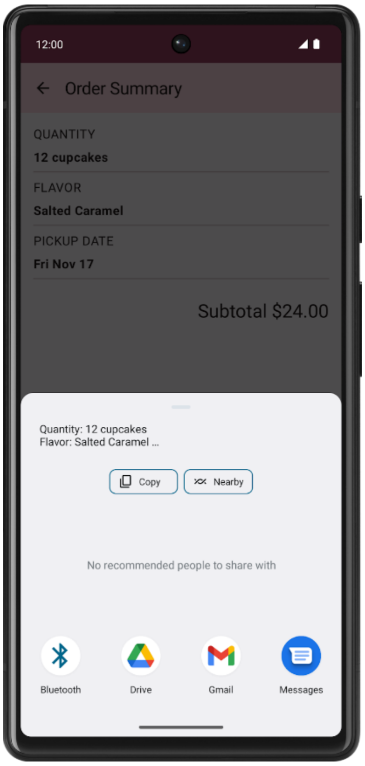
```
composable(route = CupcakeScreen.Summary.name) {
    val context = LocalContext.current

    ...
}
```

12. In the lambda body of `onSendButtonClicked()`, call `shareOrder()`, passing in the `context`, `subject`, and `summary` as arguments.

```
onSendButtonClicked = { subject: String, summary: String ->
    shareOrder(context, subject = subject, summary = summary)
}
```

13. Run your app and navigate through the screens.

When you click **Send Order to Another App**, you should see sharing actions such as **Messaging** and **Bluetooth** on the bottom sheet, along with the subject and summary you provided as extras.



QUANTITY
12 cupcakes

FLAVOR
Salted Caramel

PICKUP DATE
Fri Nov 17

Subtotal $24.00

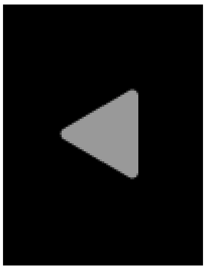
Quantity: 12 cupcakes
Flavor: Salted Caramel ...

No recommended people to share with

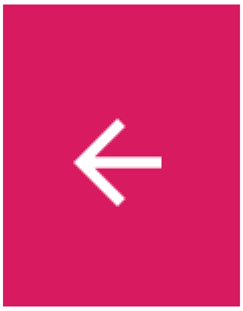
7. Make the app bar respond to navigation

Even though your app functions and can navigate to and from every screen, there's still something missing from the screenshots at the start of this codelab. The app bar does not automatically respond to navigation. The title doesn't update when the app navigates to a new route nor does it display the Up button before the title when appropriate.

Note: The system back button is provided by the Android operating system and is located at the bottom of the screen.



The Up button, on the other hand, is located in your app's AppBar.



Within the context of your app, both the back button and the Up button do the same thing—navigate back to the previous screen.

The starter code includes a composable to manage the `AppBar` named `CupcakeAppBar`. Now that you have implemented navigation in the app, you can use the information from the back stack to display the correct title and show the Up button if appropriate. The `CupcakeAppBar` composable should be aware of the current screen so that the title updates appropriately.

1. In the `CupcakeScreen` enum in `CupcakeScreen.kt` add a parameter of type `Int` named `title` using the `@StringRes` annotation.

```
import androidx.annotation.StringRes

enum class CupcakeScreen(@StringRes val title: Int) {
    Start,
    Flavor,
    Pickup,
    Summary
}
```

2. Add a resource value for each enum case, corresponding to the title text for each screen. Use `app_name` for the `Start` screen, `choose_flavor` for the `Flavor` screen, `choose_pickup_date` for the `Pickup` screen, and `order_summary` for the `Summary` screen.

```
enum class CupcakeScreen(@StringRes val title: Int) {
    Start(title = R.string.app_name),
    Flavor(title = R.string.choose_flavor),
    Pickup(title = R.string.choose_pickup_date),
    Summary(title = R.string.order_summary)
}
```

3. Add a parameter named `currentScreen` of type `CupcakeScreen` to the `CupcakeAppBar` composable.

```
fun CupcakeAppBar(
    currentScreen: CupcakeScreen,
    canNavigateBack: Boolean,
    navigateUp: () -> Unit = {},
    modifier: Modifier = Modifier
)
```

4. Inside `CupcakeAppBar`, replace the hard coded app name with the current screen's title by passing in `currentScreen.title` to the call to `stringResource()` for the title parameter of `TopAppBar`.

```
TopAppBar(
    title = { Text(stringResource(currentScreen.title)) },
    modifier = modifier,
    navigationIcon = {
        if (canNavigateBack) {
            IconButton(onClick = navigateUp) {
                Icon(
                    imageVector = Icons.Filled.ArrowBack,
                    contentDescription =
stringResource(R.string.back_button)
                )
            }
        }
    }
)
```

The Up button should only show if there's a composable on the back stack. If the app has no screens on the back stack—`StartOrderScreen` is shown—then the Up button should not show. To check this, you need a reference to the back stack.

1. In the `CupcakeApp` composable, below the `navController` variable, create a variable named `backStackEntry` and call the `currentBackStackEntryAsState()` method of `navController` using the by delegate.

import androidx.navigation.compose.currentBackStackEntryAsState

```
@Composable
fun CupcakeApp(
    viewModel: OrderViewModel = viewModel(),
    navController: NavHostController = rememberNavController()
){

    val backStackEntry by
navController.currentBackStackEntryAsState()

    ...
}
```

2. Convert the current screen's title to a value of `CupcakeScreen`. Below the `backStackEntry` variable, create a variable using `val` named `currentScreen` equal to the result of calling the `valueOf()` class function of `CupcakeScreen`, and pass in the route of the destination of `backStackEntry`. Use the elvis operator to provide a default value of `CupcakeScreen.Start.name`.

```
val currentScreen = CupcakeScreen.valueOf(
    backStackEntry?.destination?.route ?:
CupcakeScreen.Start.name
)
```

3. Pass the value of `currentScreen` variable into the parameter of the same name of the `CupcakeAppBar` composable.

```
CupcakeAppBar(
    currentScreen = currentScreen,
    canNavigateBack = false,
    navigateUp = {}
)
```

As long as there's a screen behind the current screen on the back stack, the Up button should show. You can use a boolean expression to identify if the Up button should appear:

1. For the `canNavigateBack` parameter, pass in a boolean expression checking if the `previousBackStackEntry` property of `navController` is not equal to null.

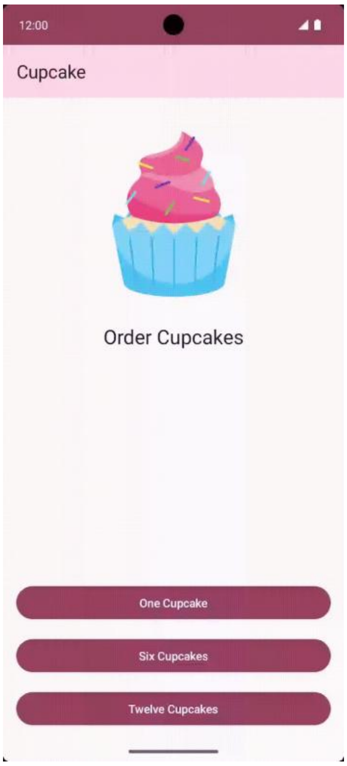
```
canNavigateBack = navController.previousBackStackEntry !=
null,
```

2. To actually navigate back to the previous screen, call the `navigateUp()` method of `navController`.

```
navigateUp = { navController.navigateUp() }
```

3. Run your app.

Notice that the `AppBar` title now updates to reflect the current screen. When you navigate to a screen other than `StartOrderScreen`, the Up button should appear and take you back to the previous screen.



8. Get the solution code

To download the code for the finished codelab, you can use these git commands:

```
$ git clone https://github.com/google-developer-training/basic-android-kotlin-compose-training-cupcake.git
$ cd basic-android-kotlin-compose-training-cupcake
$ git checkout navigation
```

Alternatively, you can download the repository as a zip file, unzip it, and open it in Android Studio.

https://github.com/google-developer-training/basic-android-kotlin-compose-training-cupcake/archive/refs/heads/navigation.zip

Note: The solution code is in the navigation branch of the downloaded repository.

If you want to see the solution code for this codelab, view it on:

https://github.com/google-developer-training/basic-android-kotlin-compose-training-cupcake/tree/navigation

9. Summary

Congratulations! You've just made the leap from simple single screen applications to a complex multi-screen app using the Jetpack Navigation component to move through multiple screens. You defined routes, handled them in a NavHost, and used function type parameters to separate the navigation logic from individual screens. You also learned how to send data to another app using intents as well as customize the app bar in response to navigation. In the upcoming units, you'll continue using these skills as you work on several other multi-screen apps of growing complexity.

Learn More

Navigating with Compose	https://developer.android.com/jetpack/compose/navigation
Navigation principles	https://developer.android.com/guide/navigation/navigation-principles
Jetpack Compose Navigation	https://developer.android.com/codelabs/jetpack-compose-navigation#0
Types of Navigation	https://material.io/design/navigation/understanding-navigation.html