BASE DE DONNÉES MOBILES

–

CORE DATA

COURS IUT LYON 1

William Antwi

PLAN DE COURS

- Introduction générale à la persistance de données
- Persistance avec des fichiers
- Premiers pas avec Core Data
- Core Data et MVC
- Debug avec Core Data
- Programmation avancée avec Core Data

NOTATION

- Orale
  - Soutenance : 10/20
  - Participation : 10/20
- Projet
  - Partie 1 : 5/20
  - Partie 2 : 5/20
  - Qualité du code : 5/20
  - UI & UX : 5/20

NOTATION – CRITÈRE

- Mise en place des éléments vus en cours
- Structure du projet
- Commentaires, syntaxe, conventions, clarté
- Rapport de projet
- Date de livraison et soutenance 6 Mai

PERSISTANCE DE DONNÉES

- Pourquoi est-ce important ?
- Cas d'utilisation
- Types de persistance
  - Fichiers (Binaires, XML, JSON, Sérialisation, Images, Sons...)
  - User Defaults (Fichiers de propriétés)
  - SQLite
  - iCloud
  - Keychain (Trousseau de clé)
  - CoreData

PERSISTANCE AVEC DES FICHIERS

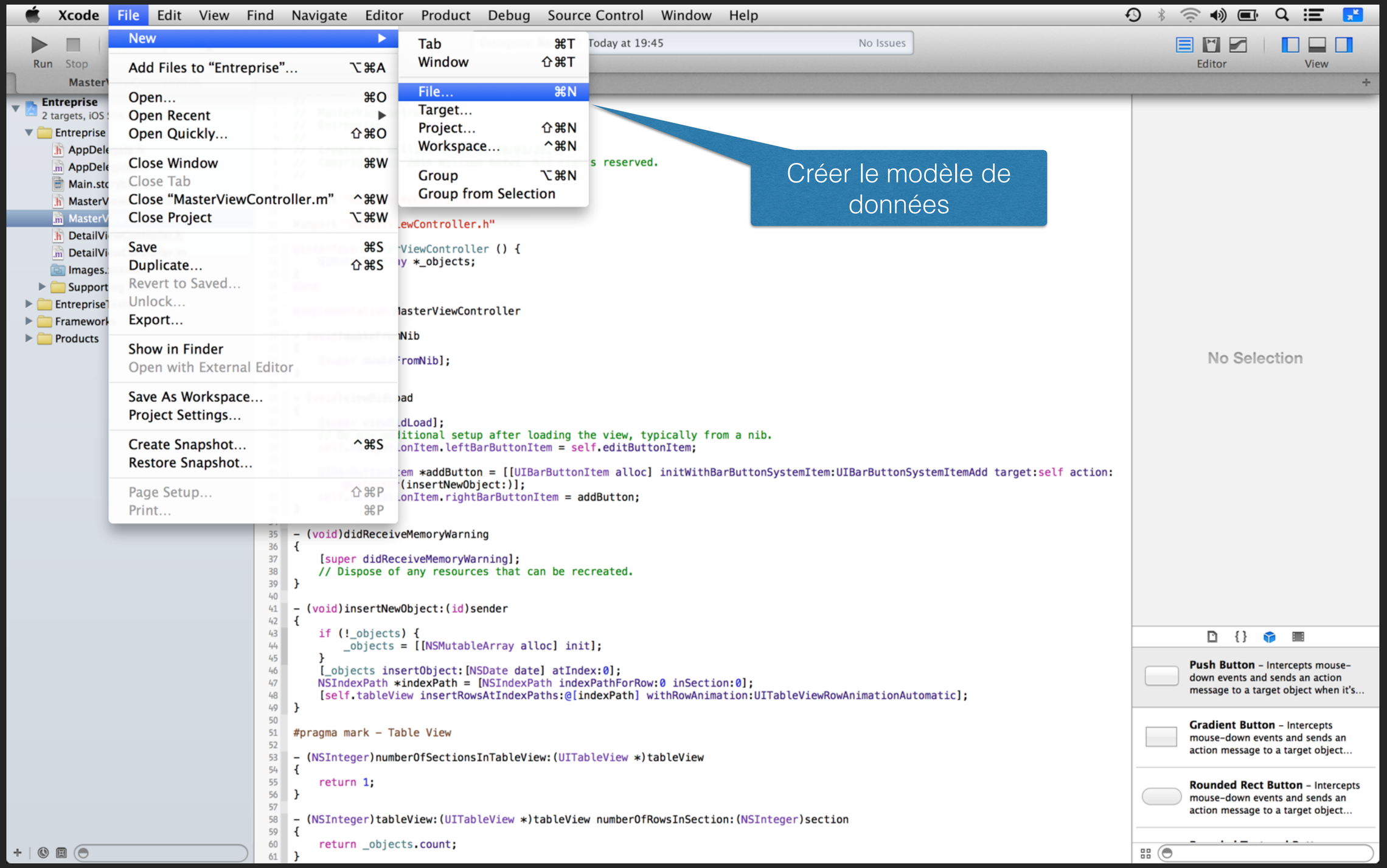
- À quelle moment il faut utiliser ce type de persistance ?
- Avantages
  - Simple à gérer
  - Possibilité de manipulation des fichiers de taille importante
- Inconvénients
  - Accès lent
  - Pas de relations entre les données
  - Pas de recherche
- Démonstration

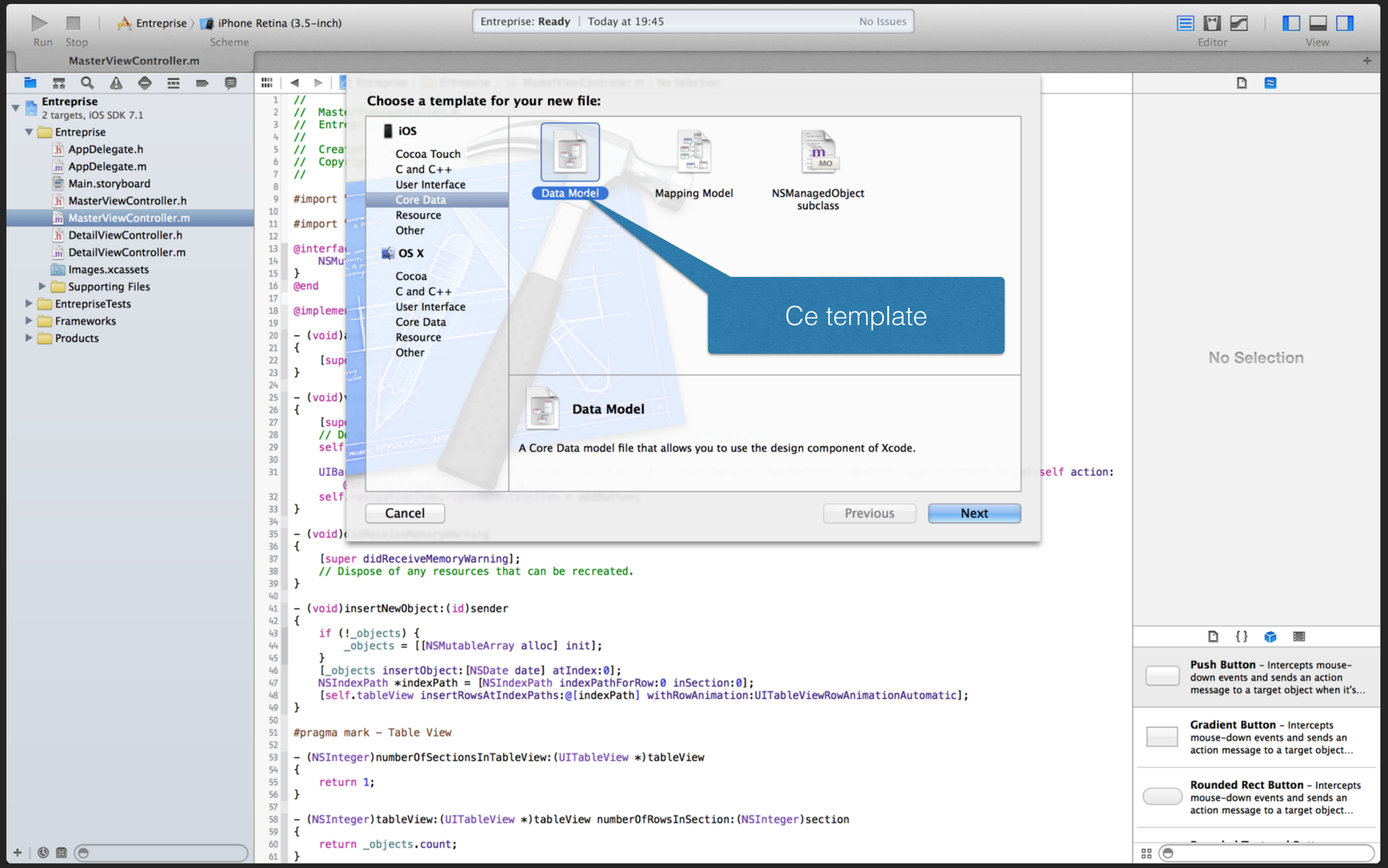
KEYCHAIN

- Cas d’utilisation
- Avantages / Inconvénients
- Conseils
- Sauvegarde de données sensibles

CORE DATA

- Base de données
  - Stockage de données en masse
  - Orienté objet
- Core data
  - Base de données orientée objet
  - Framework très performant
  - Surcouche SQLite / XML
- Comment ça marche ?
  - Créer un modèle de données
  - Créer des données et requêtes de base de données avec l'API
  - Accéder aux colonnes de la base via les propriétés


Xcode File Edit View Find Navigate Editor Product Debug Source Control Window Help
New
Add Files to "Entreprise"... ⌥⌘A
Open... ⌘O
Open Recent
Open Quickly... ⇧⌘O
Close Window ⌘W
Close Tab
Close "MasterViewController.m" ^⌘W
Close Project ⌥⌘W
Save ⌘S
Duplicate... ⇧⌘S
Revert to Saved...
Unlock...
Export...
Show in Finder
Open with External Editor
Save As Workspace...
Project Settings...
Create Snapshot... ^⌘S
Restore Snapshot...
Page Setup... ⇧⌘P
Print... ⌘P
Tab ⌘T
Window ⇧⌘T
File... ⌘N
Target...
Project... ⇧⌘N
Workspace... ^⌘N
Group ⌥⌘N
Group from Selection
Créer le modèle de données
No Selection
Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
Gradient Button – Intercepts mouse-down events and sends an action message to a target object...
Rounded Rect Button – Intercepts mouse-down events and sends an action message to a target object...


Choose a template for your new file:
iOS
Cocoa Touch
C and C++
User Interface
Core Data
Resource
Other
OS X
Cocoa
C and C++
User Interface
Core Data
Resource
Other
Data Model
Mapping Model
NSManagedObject subclass
Ce template
Data Model
A Core Data model file that allows you to use the design component of Xcode.
Cancel
Previous
Next
Entreprise
2 targets, iOS SDK 7.1
AppDelegate.h
AppDelegate.m
Main.storyboard
MasterViewController.h
MasterViewController.m
DetailViewController.h
DetailViewController.m
Images.xcassets
Supporting Files
EntrepriseTests
Frameworks
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No Selection
Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
Gradient Button – Intercepts mouse-down events and sends an action message to a target object...
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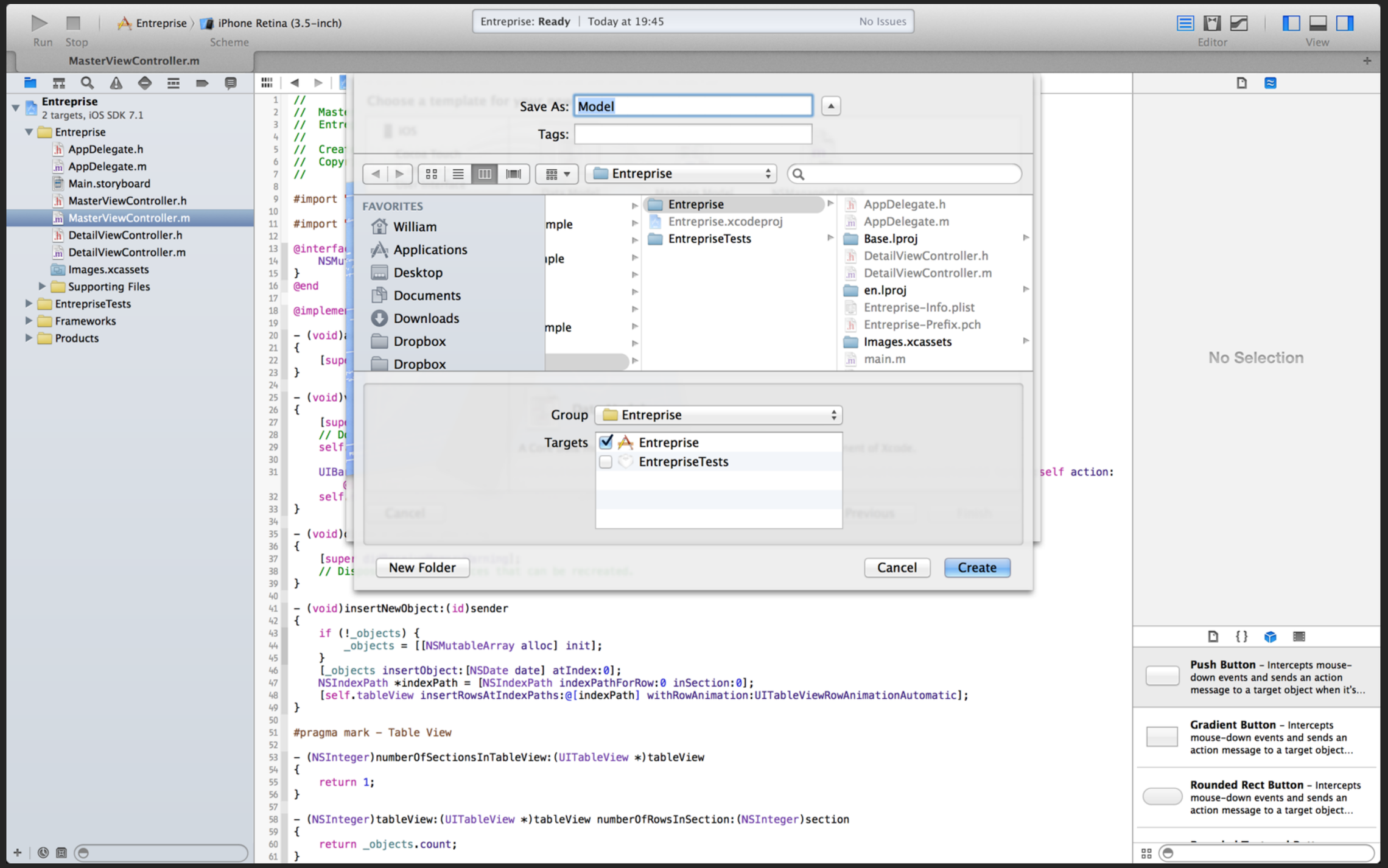


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#import "

#import "

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}
@end

@implemer

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- (void)v
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    self
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- (void)
{
    [super
    // Dis
}

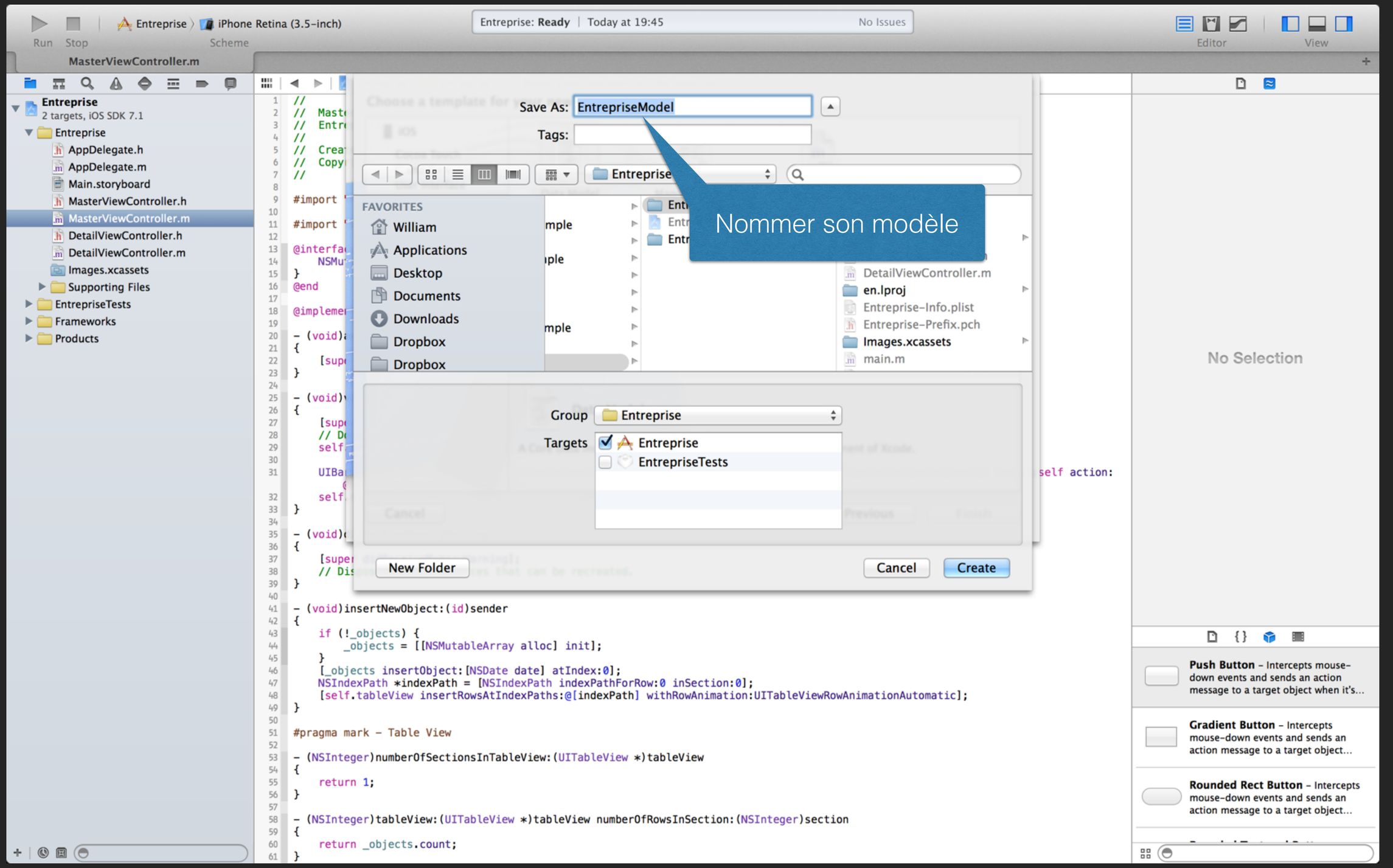
- (void)insertNewObject:(id)sender
{
    if (!_objects) {
        _objects = [[NSMutableArray alloc] init];
    }
    [_objects insertObject:[NSDate date] atIndex:0];
    NSIndexPath *indexPath = [NSIndexPath indexPathForRow:0 inSection:0];
    [self.tableView insertRowsAtIndexPaths:@[indexPath] withRowAnimation:UITableViewRowAnimationAutomatic];
}

#pragma mark - Table View

- (NSInteger)numberOfSectionsInTableView:(UITableView *)tableView
{
    return 1;
}

- (NSInteger)tableView:(UITableView *)tableView numberOfRowsInSection:(NSInteger)section
{
    return _objects.count;
}
```

```
self action:
```

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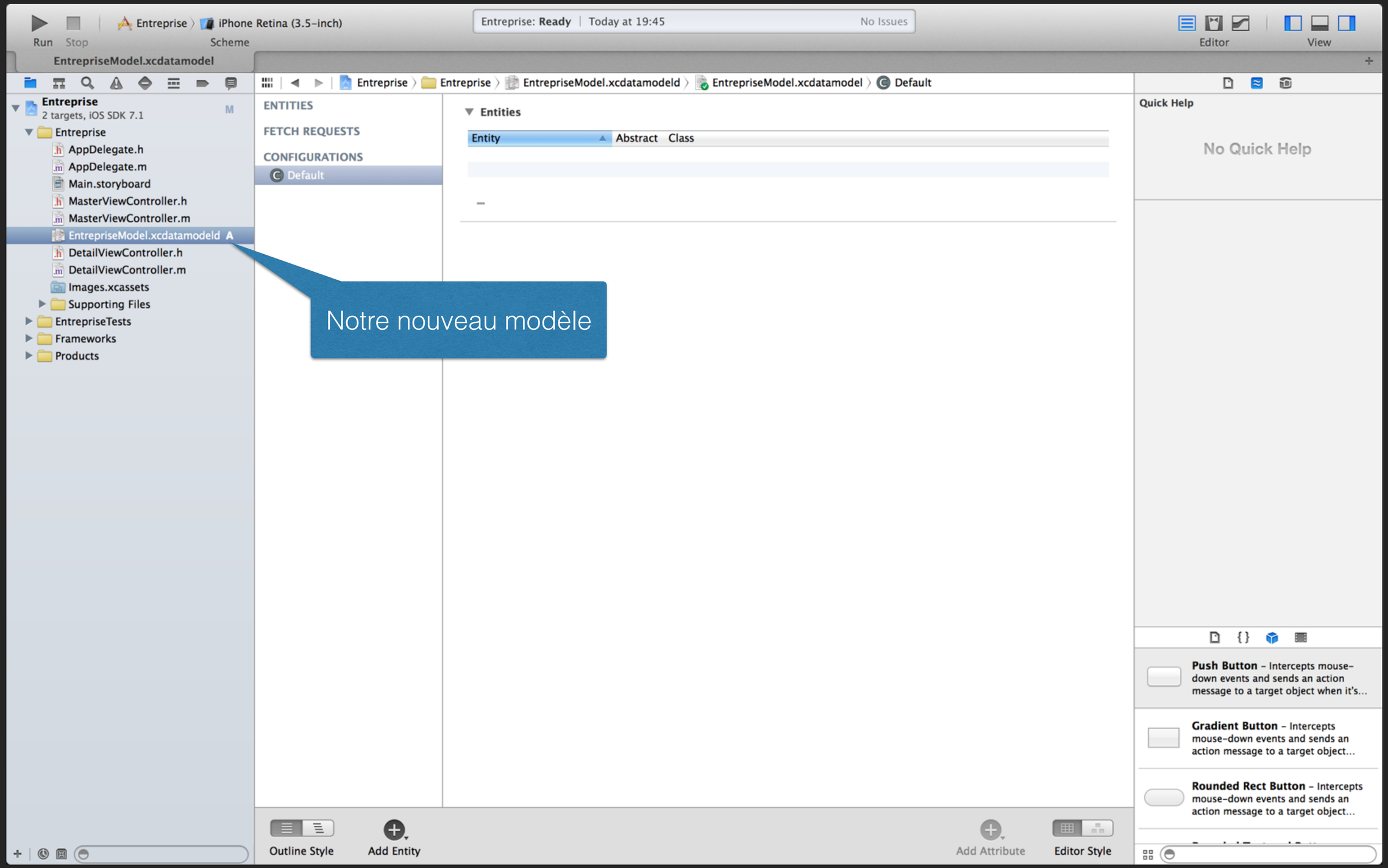
Run
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Entreprise
iPhone Retina (3.5-inch)
Scheme
Entreprise: Ready | Today at 19:45
No Issues
Editor
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Entreprise
2 targets, iOS SDK 7.1
Entreprise
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Main.storyboard
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MasterViewController.m
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EntrepriseModel.xcdatamodel
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Abstract
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Quick Help
No Quick Help
Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
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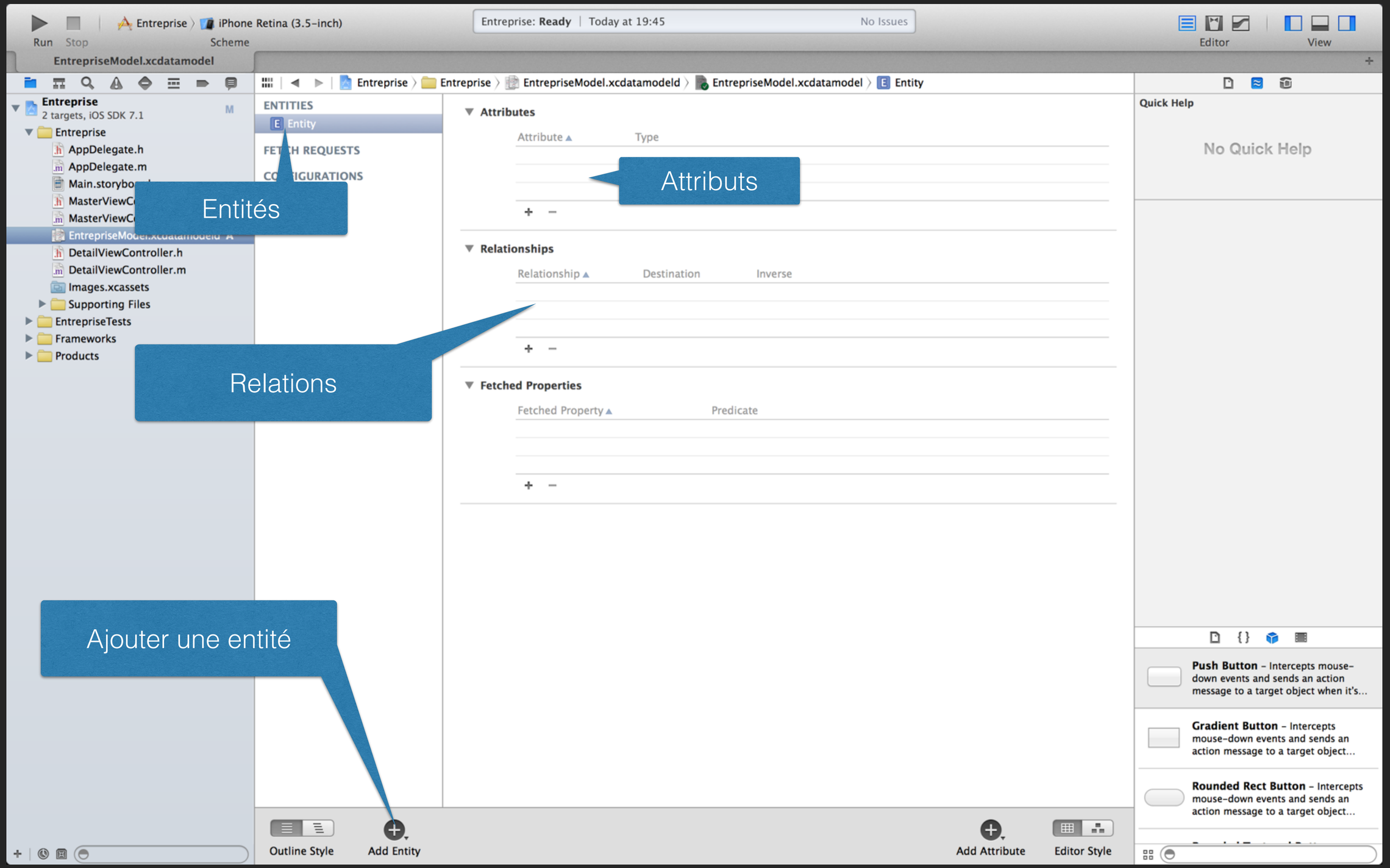
Outline Style
Add Entity
Add Attribute
Editor Style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Fetched Properties
Fetched Property
Predicate
Ajouter une entité
Outline Style
Add Entity
Add Attribute
Editor Style
Quick Help
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Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
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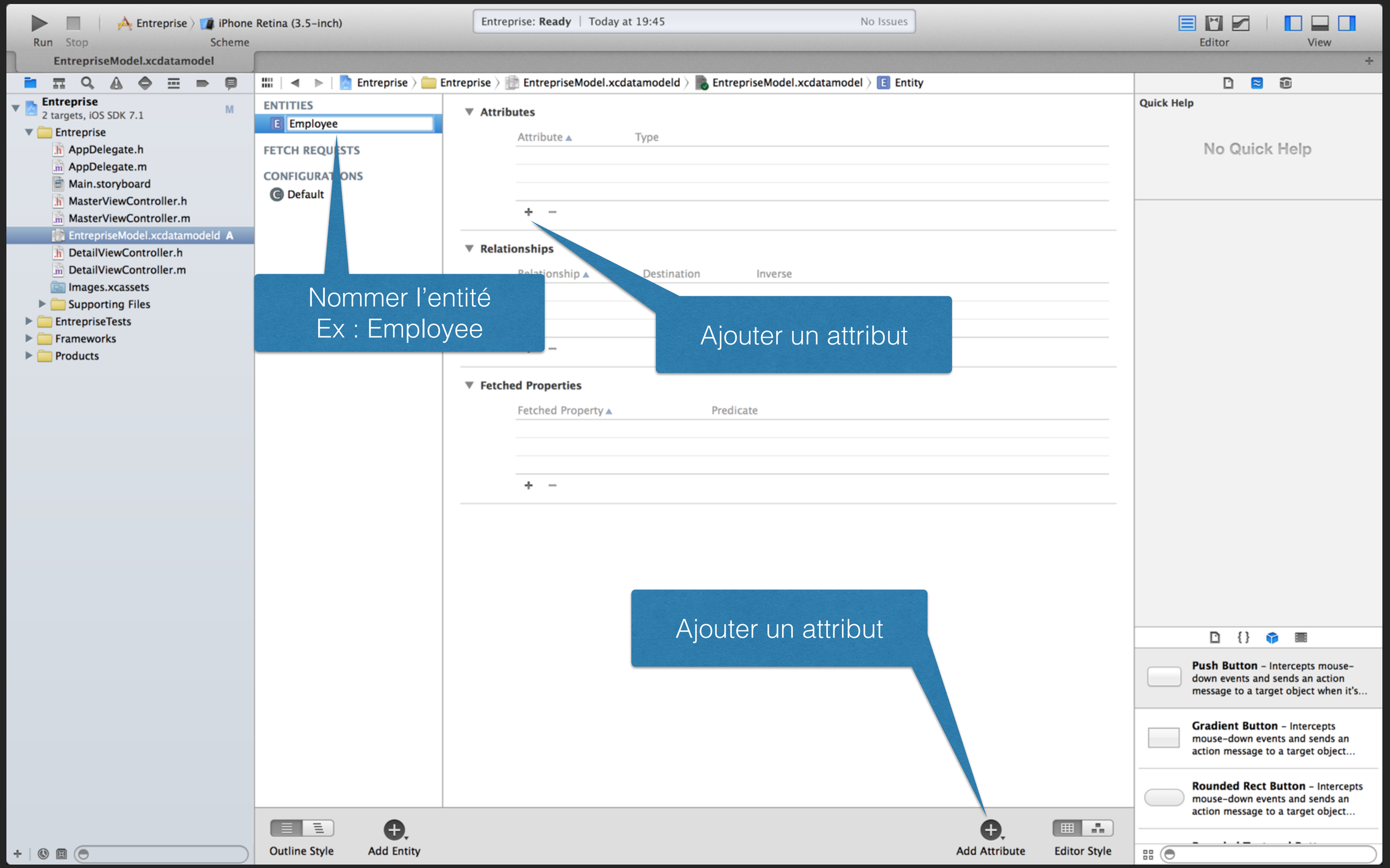
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Attribute
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Relationship
Destination
Inverse
Fetched Properties
Fetched Property
Predicate
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Ajouter un attribut
Ajouter un attribut
Quick Help
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Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
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Outline Style
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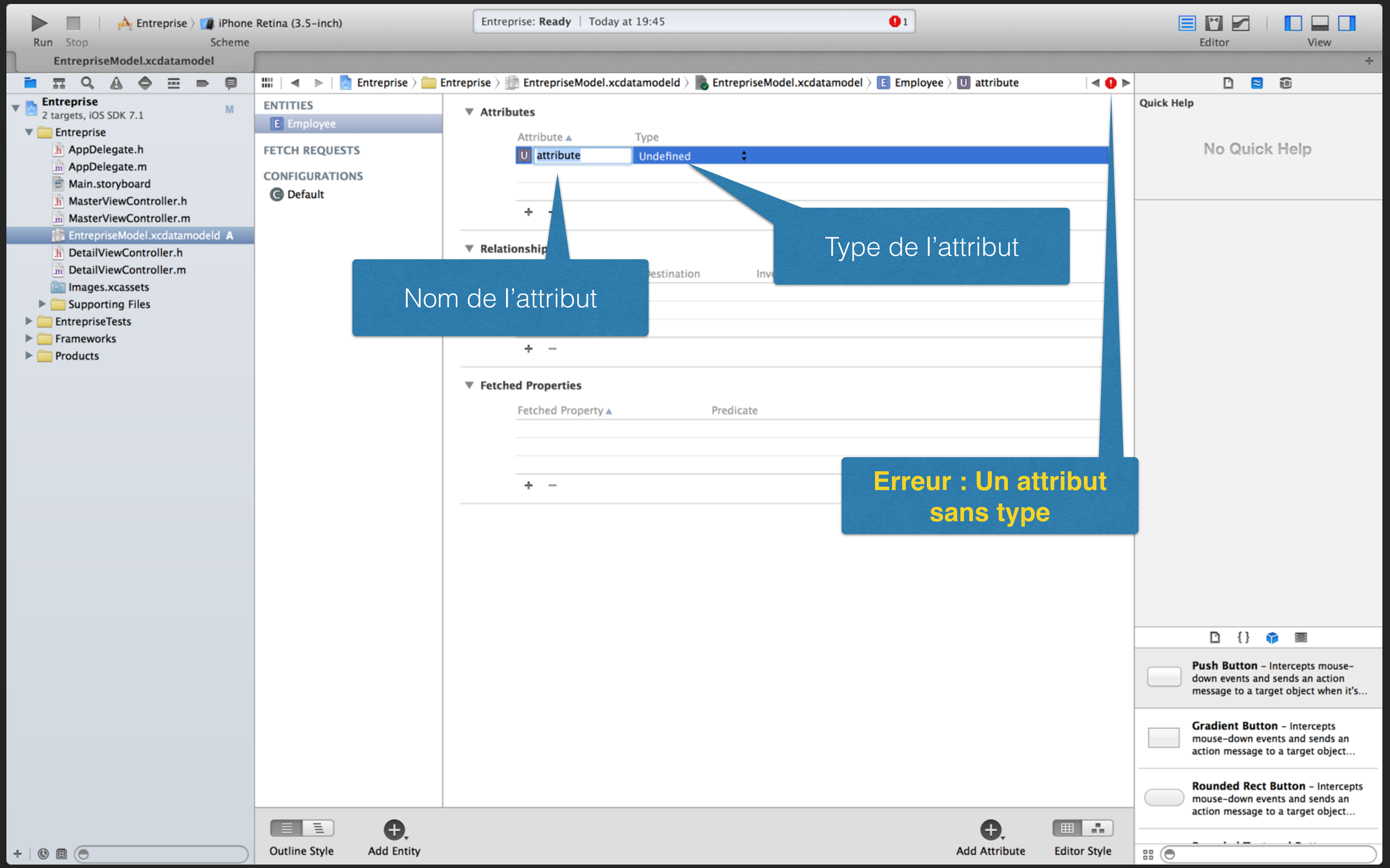
Editor Style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Predicate
Nom de l'attribut
Type de l'attribut
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Quick Help
No Quick Help
Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
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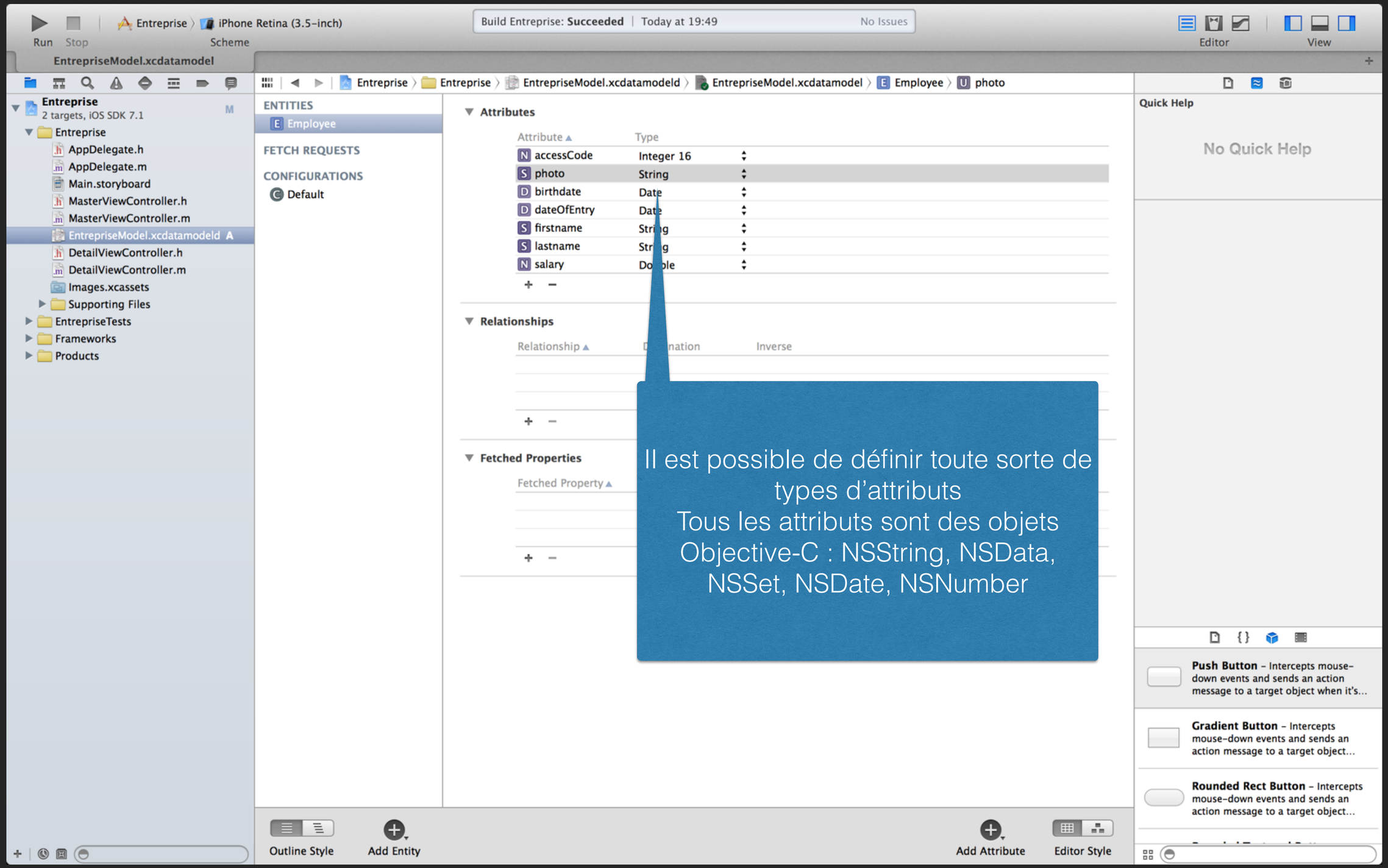
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Build Entreprise: Succeeded | Today at 19:49
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Fetched Property
Il est possible de définir toute sorte de types d'attributs
Tous les attributs sont des objets Objective-C : NSString, NSData, NSSet, NSDate, NSNumber
Quick Help
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Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
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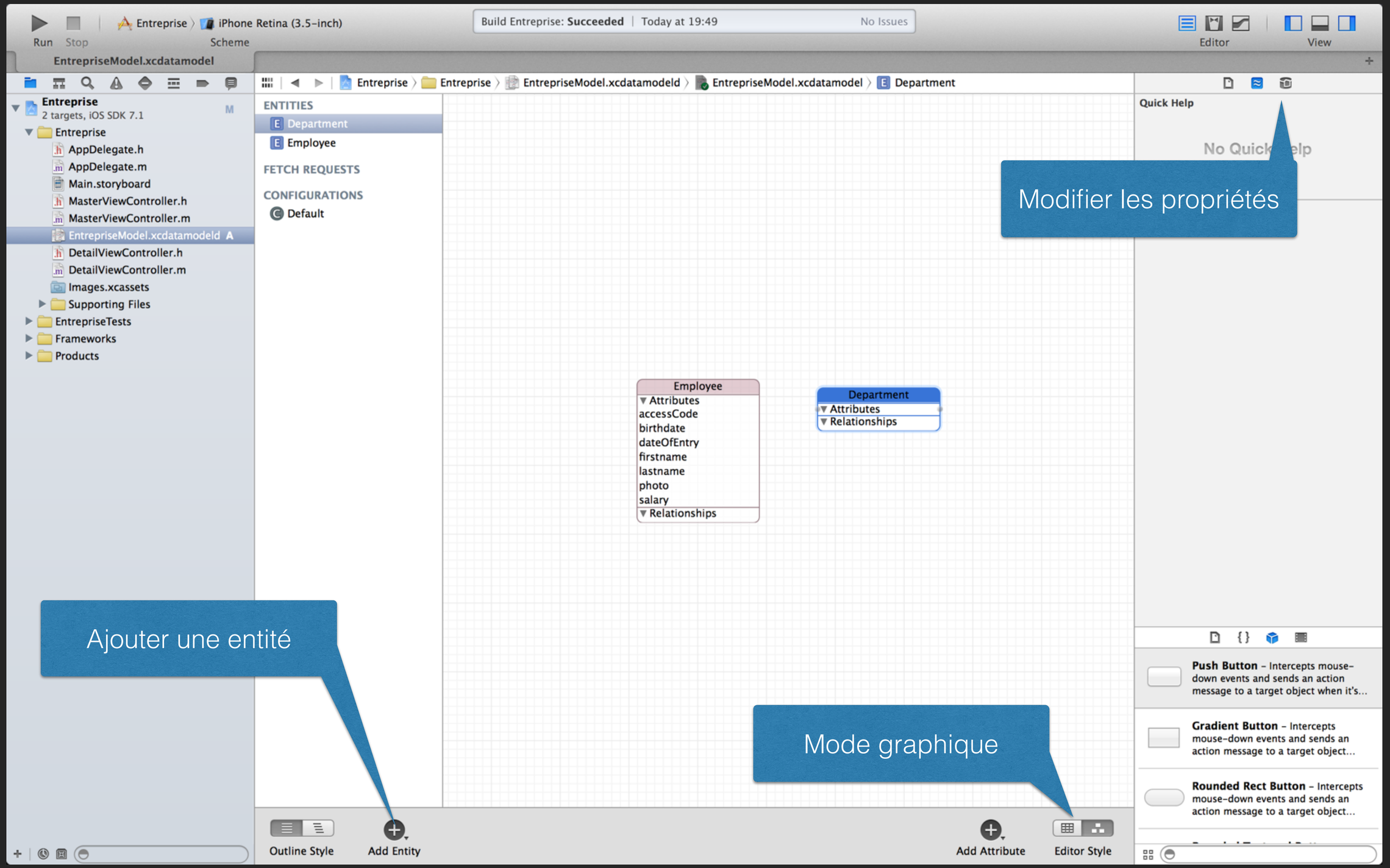
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Employee
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Relationships
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Attributes
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Ajouter une entité
Mode graphique
Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
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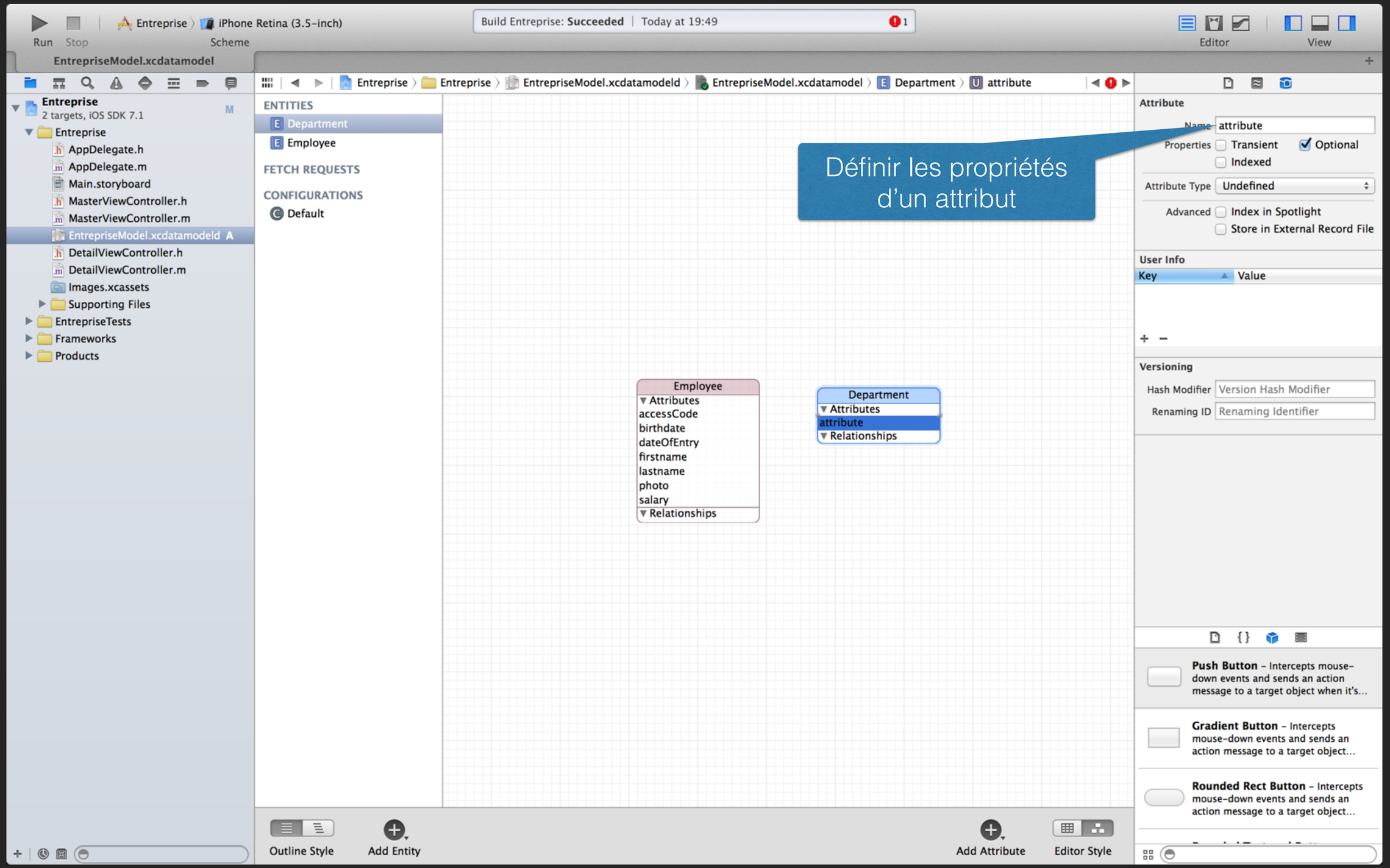
Outline Style
Add Entity
Add Attribute
Editor Style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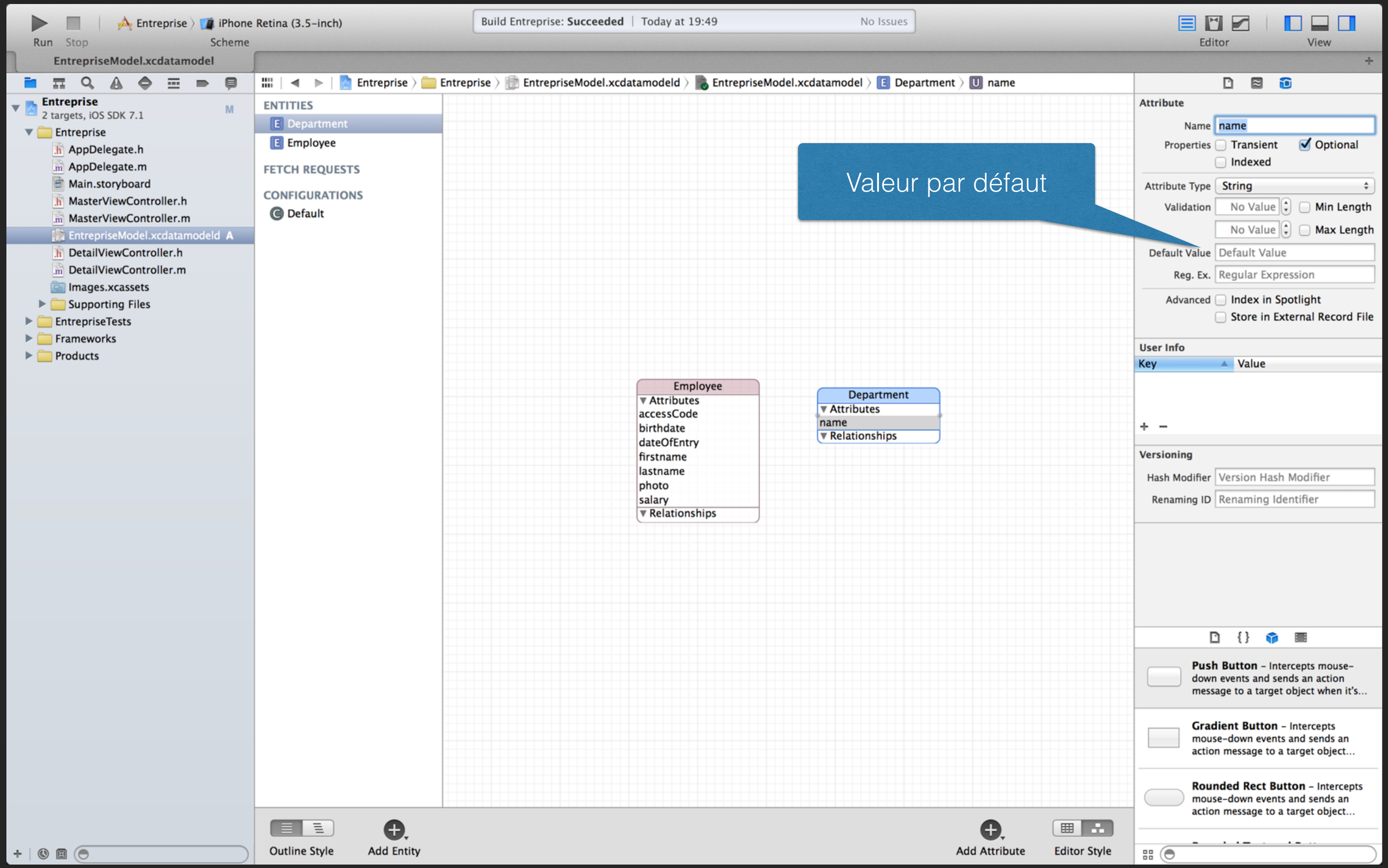
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Department
Attributes
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Relationships
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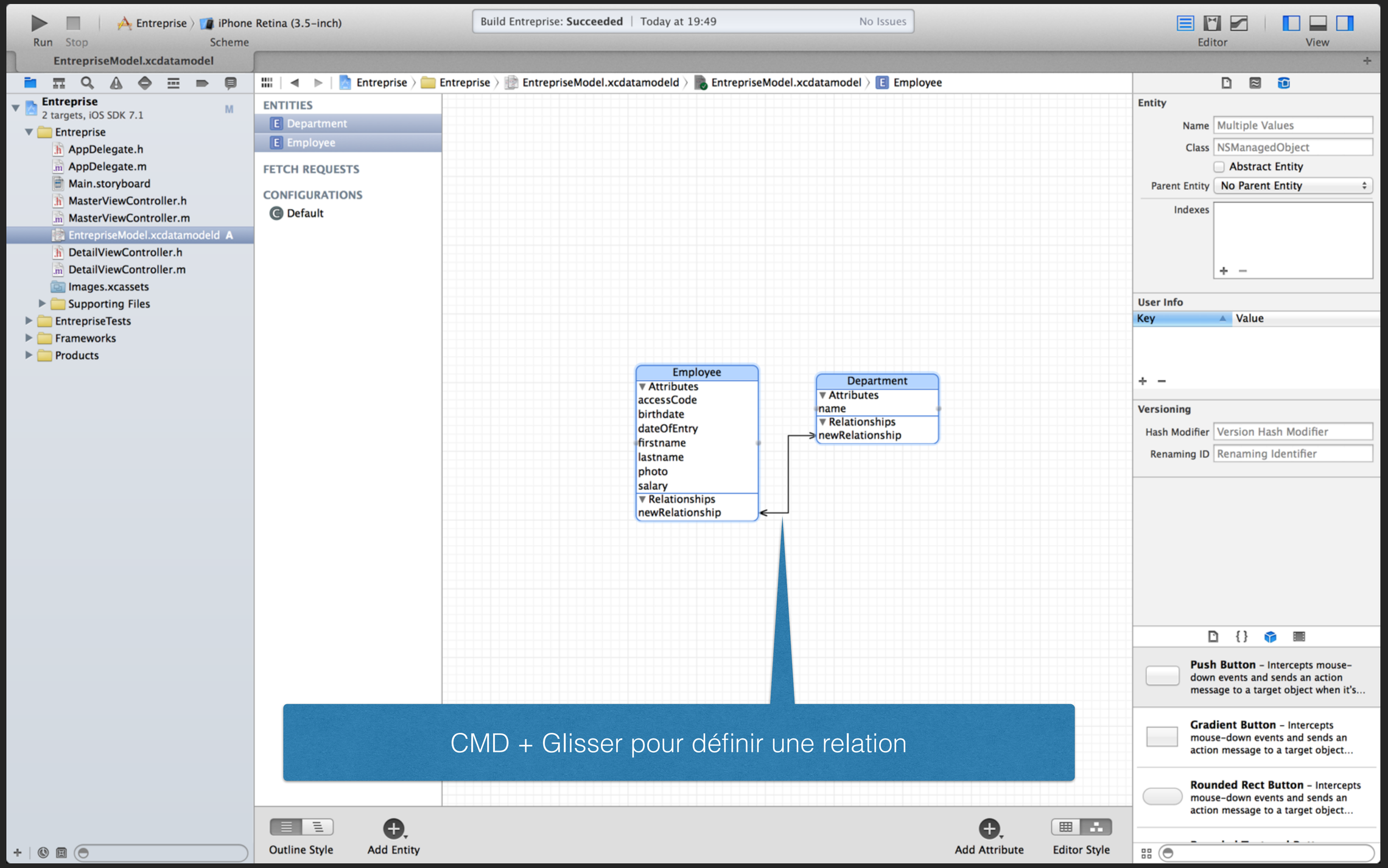
Add Entity
Add Attribute
Editor Style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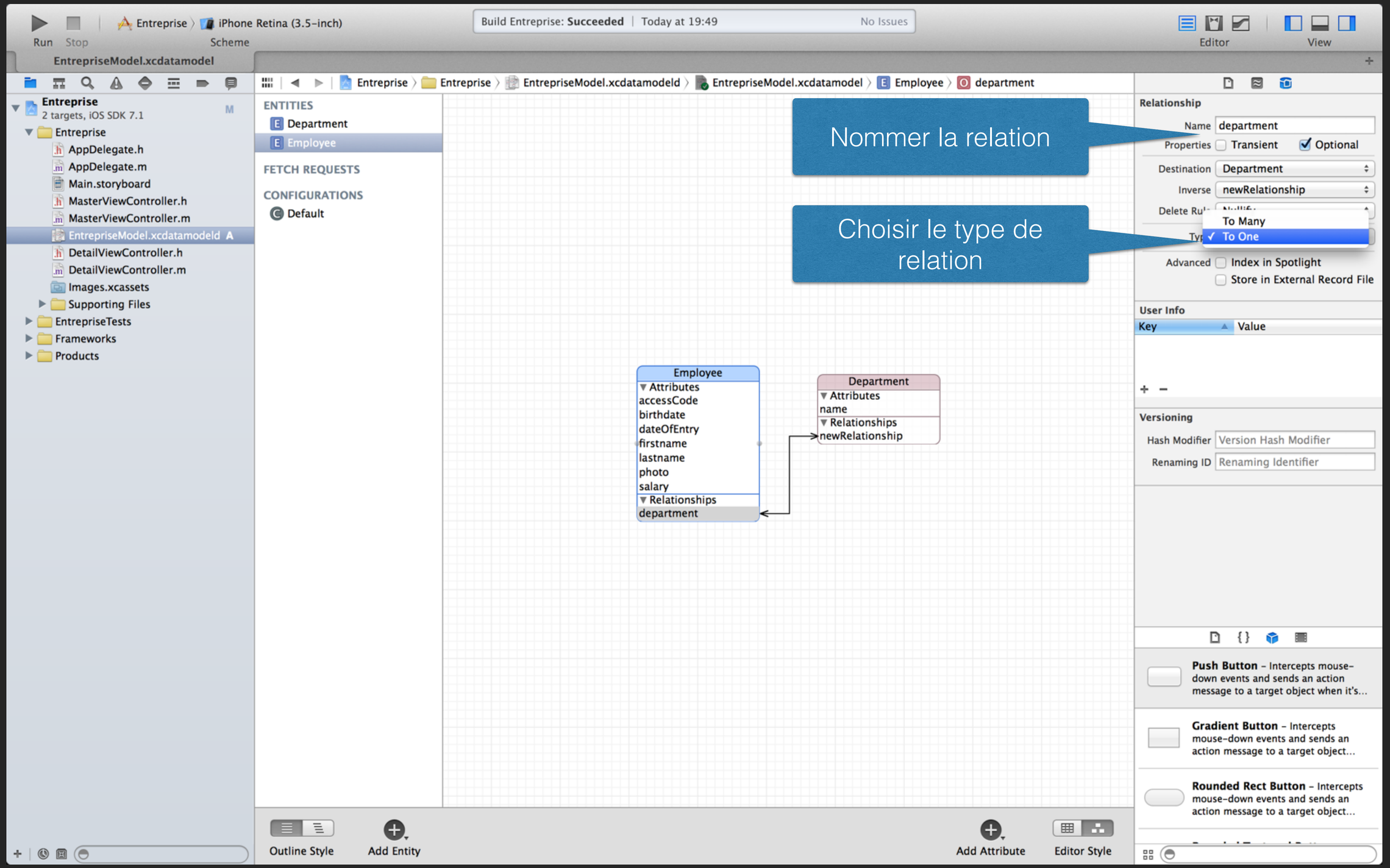
firstname
lastname
photo
salary
Relationships
newRelationship
Department
Attributes
name
Relationships
newRelationship
Entity
Name
Multiple Values
Class
NSManagedObject
Abstract Entity
Parent Entity
No Parent Entity
Indexes
User Info
Key
Value
Versioning
Hash Modifier
Version Hash Modifier
Renaming ID
Renaming Identifier
Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
Gradient Button – Intercepts mouse-down events and sends an action message to a target object...
Rounded Rect Button – Intercepts mouse-down events and sends an action message to a target object...
CMD + Glisser pour définir une relation
Outline Style
Add Entity
Add Attribute
Editor Style


Nommer la relation
Choisir le type de relation
Employee
Attributes
accessCode
birthdate
dateOfEntry
firstname
lastname
photo
salary
Relationships
department
Department
Attributes
name
Relationships
newRelationship
To Many
To One
Relationship
Name
department
Properties
Transient
Optional
Destination
Department
Inverse
newRelationship
Advanced
Index in Spotlight
Store in External Record File
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Add Attribute
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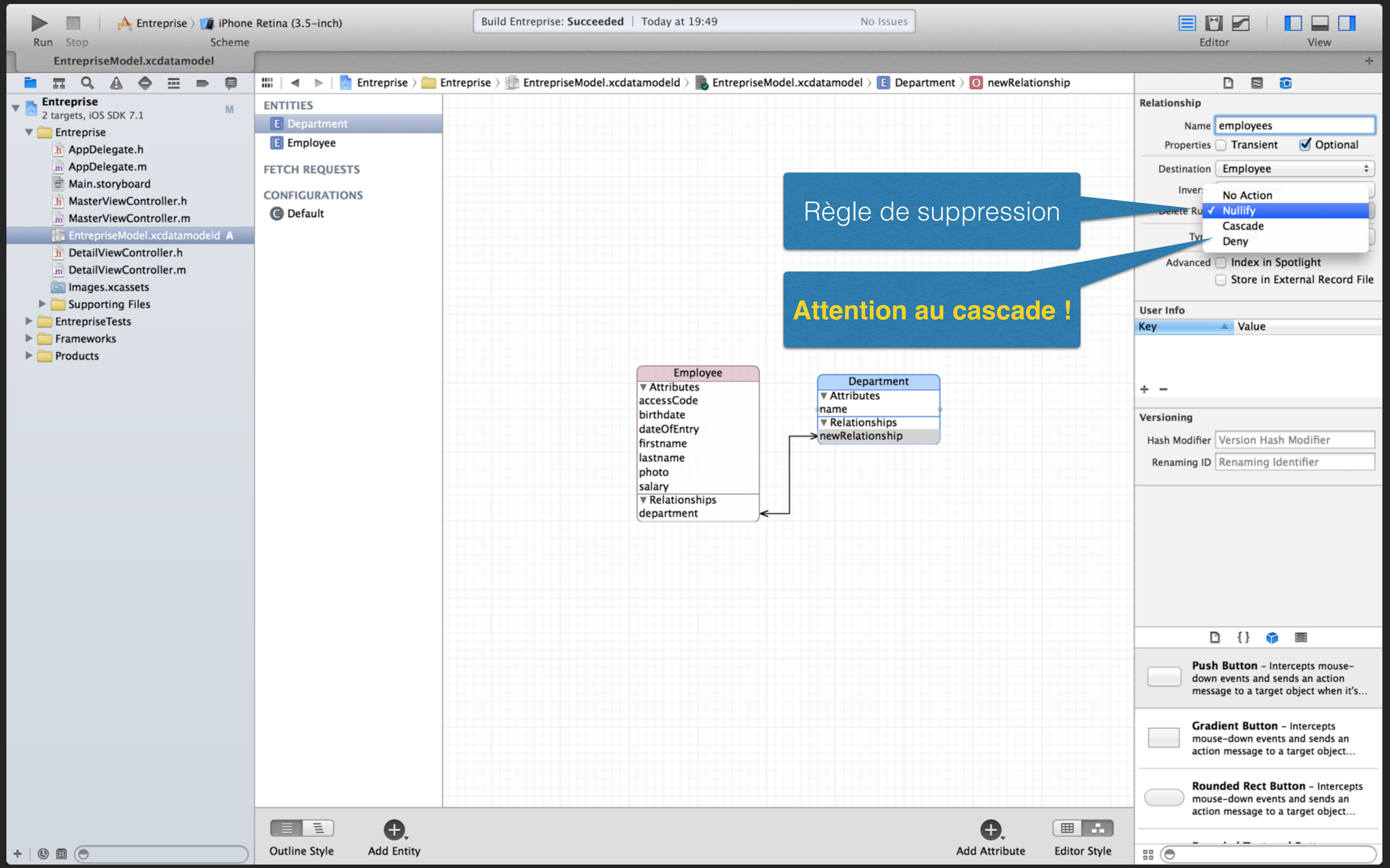
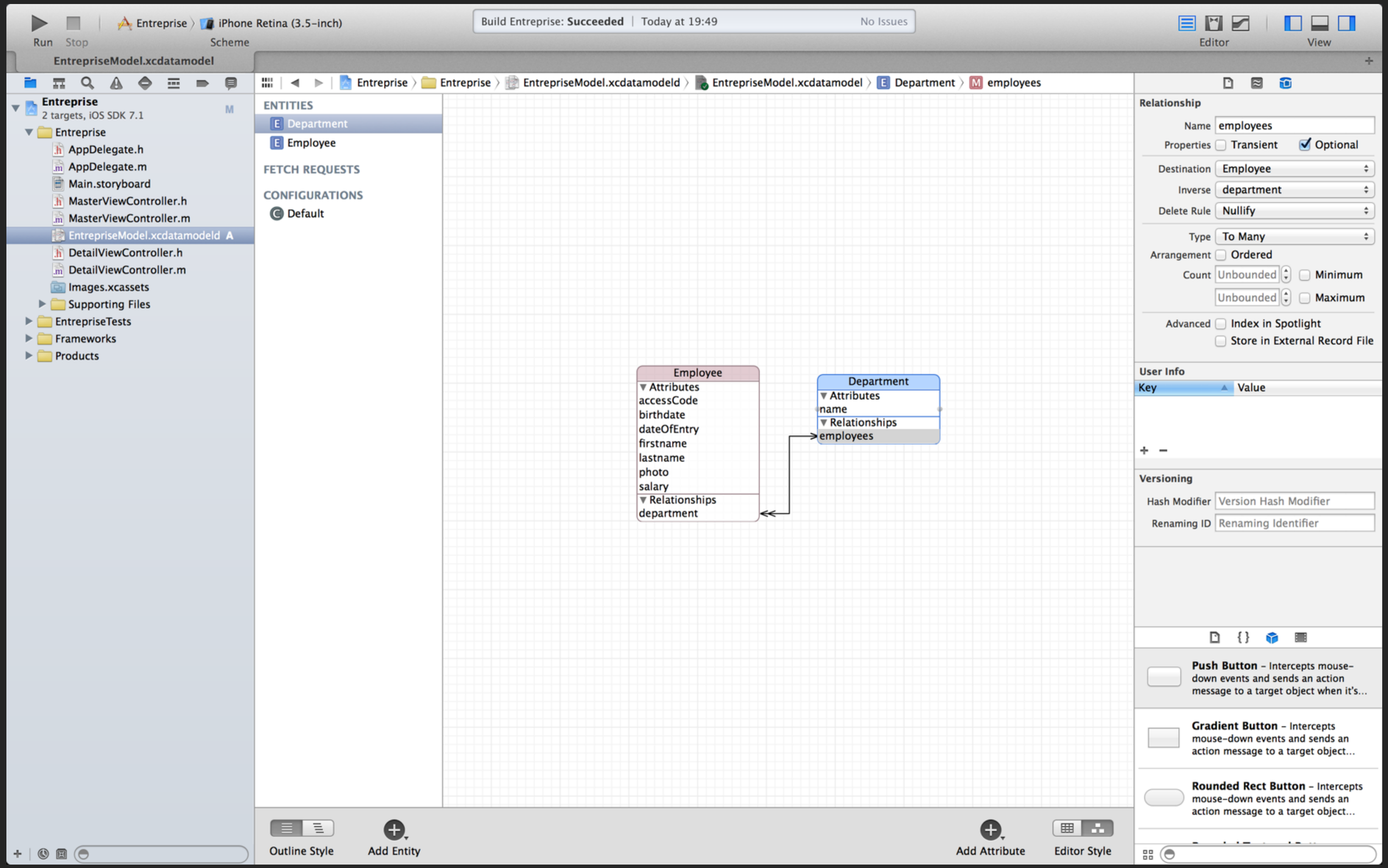
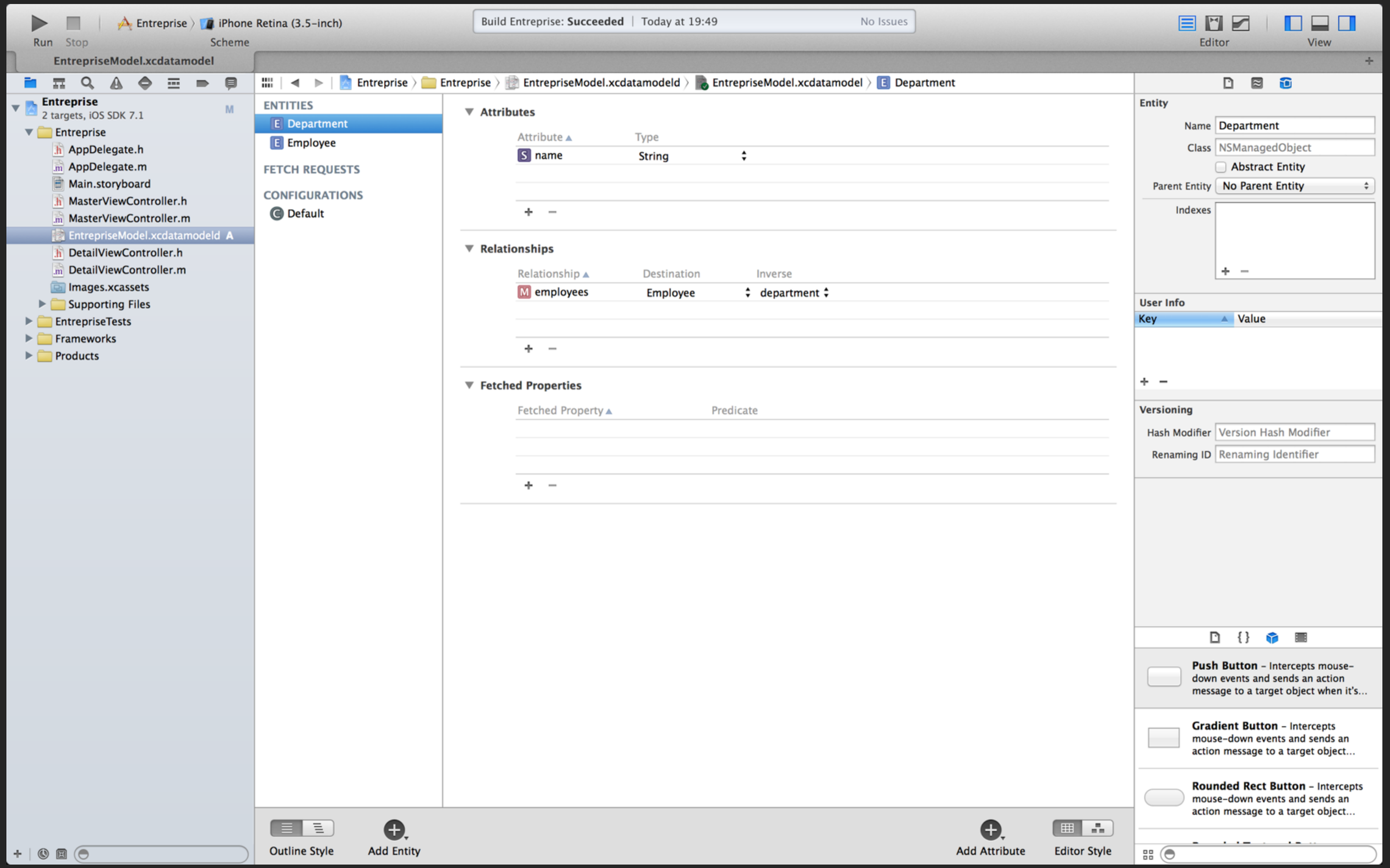
Gradient Button – Intercepts mouse-down events and sends an action message to a target object...
Rounded Rect Button – Intercepts mouse-down events and sends an action message to a target object...


Règle de suppression
Attention au cascade !
Employee
Attributes
accessCode
birthdate
dateOfEntry
firstname
lastname
photo
salary
Relationships
department
Department
Attributes
name
Relationships
newRelationship
No Action
Nullify
Cascade
Deny


Run
Stop
Entreprise
iPhone Retina (3.5-inch)
Scheme
Build Entreprise: Succeeded | Today at 19:49
No Issues
Editor
View
EntrepriseModel.xcdatamodel
Entreprise
2 targets, iOS SDK 7.1
Entreprise
AppDelegate.h
AppDelegate.m
Main.storyboard
MasterViewController.h
MasterViewController.m
EntrepriseModel.xcdatamodeld
DetailViewController.h
DetailViewController.m
Images.xcassets
Supporting Files
EntrepriseTests
Frameworks
Products
Entreprise › Entreprise › EntrepriseModel.xcdatamodeld › EntrepriseModel.xcdatamodel › Department › employees
ENTITIES
Department
Employee
FETCH REQUESTS
CONFIGURATIONS
Default
Employee
Attributes
accessCode
birthdate
dateOfEntry
firstname
lastname
photo
salary
Relationships
department
Department
Attributes
name
Relationships
employees
Relationship
Name employees
Properties Transient Optional
Destination Employee
Inverse department
Delete Rule Nullify
Type To Many
Arrangement Ordered
Count Unbounded Minimum
Unbounded Maximum
Advanced Index in Spotlight
Store in External Record File
User Info
Key
Value
Versioning
Hash Modifier Version Hash Modifier
Renaming ID Renaming Identifier
Push Button – Intercepts mouse-down events and sends an action message to a target object when it's...
Gradient Button – Intercepts mouse-down events and sends an action message to a target object...
Rounded Rect Button – Intercepts mouse-down events and sends an action message to a target object...
Outline Style
Add Entity
Add Attribute
Editor Style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Attribute
Type
name
String
Relationships
Relationship
Destination
Inverse
employees
Employee
department
Fetched Properties
Fetched Property
Predicate
Entity
Name
Department
Class
NSManagedObject
Abstract Entity
Parent Entity
No Parent Entity
Indexes
User Info
Key
Value
Versioning
Hash Modifier
Version Hash Modifier
Renaming ID
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INTERAGIR AVEC LE MODÈLE

- Le modèle de données est conçu !
- Que faire ?
- Swift ?
- Oui ! Mais où est le code ?

INTERAGIR AVEC LE MODÈLE

- Vous devez disposer d'un NSManagedObjectContext
- C'est l'objet central pour communiquer avec la base de données
- Comment l'obtenir ?
  - Créer un NSManagedObjectContext
  - Il est également possible d'utiliser un UIManagedDocument
  - Le NSManagedObjectContext est automatiquement créé pour vous lorsqu'au démarrage du projet, vous cochez "Use Core Data"
  - Démonstration

CORE DATA

- Insérer des objets en base

```
let entity = NSEntityDescription.entityForName("Employee", inManagedObjectContext:
managedContext)

let employee = NSManagedObject(entity: entity!, insertIntoManagedObjectContext:
managedContext)
```

  - Un NSManagedObject est la représentation objet d'une entrée de la base de données
  - Par défaut, tous les attributs de l'objet seront à nil (à moins d'avoir spécifier une valeur par défaut)

- Modifier les attributs de l'objet

```
employee.setValue("William", forKey: "firstname")

employee.setValue("Antwi", forKey: "lastname")
```

REQUÊTES

- Comment récupérer des objets en base ?
  - Récupérer le NSManagedObjectContext
  - Créer un NSFetchRequest
  - Exemple

```
let fetchRequest = NSFetchRequest(entityName: "Employee")

var error: NSError?

let fetchedResults = managedContext.executeFetchRequest(fetchRequest, error: &error)
as [NSManagedObject]?
```

  - Démonstration

CORE DATA

- Suppression
  - La suppression est très simple

```
managedContext.deleteObject(task)
```

  - Attention aux règles de suppression
  - Les relations seront automatiquement mises à jour
  - Ne pas garder de référence vers cet objet
- Préparer la suppression
  - Il est possible de préparer un objet à la suppression
  - Pourquoi ?

CORE DATA

- Les classes de Core Data
  - NSManagedObjectContext
  - NSManagedObjectModel
  - NSPersistentStoreCoordinator
  - NSPersistentStore
- Data Manager
  - Singleton
  - Gestion centralisée des données

REQUÊTES

- Comment récupérer des objets en base ?
  - Créer un NSFetchRequest
  - Définir le nombre d'objets à récupérer
  - Trier ces objet à l'aide NSSortDescriptors
  - Filtrer les objects avec un ou plusieurs NSPredicate
  - Exemple

```
let fetchedRequest = NSFetchRequest(entityName: "Task")
fetchedRequest.fetchBatchSize = 20
fetchedRequest.fetchLimit = 100
let sortDescriptor = NSSortDescriptor(key: "name", ascending: true)
fetchedRequest.sortDescriptors = [sortDescriptor]
fetchedRequest.predicate = NSPredicate(format: "name = %@", "Task 1")
```

REQUÊTES

- **NSSortDescriptor**
  - Le résultat d'une requête est un NSArray the NSManagedObjects
  - Les NSArray sont des tableaux "ordonnés", il est donc intéressant de trier les données lors des requêtes
  - Il faut donner une list de "sort descriptors" pour décrire le type de tri voulu

```
let sortDescriptor = NSSortDescriptor(key: "name", ascending: true)
fetchedRequest.sortDescriptors = [sortDescriptor]
```

  - Ici tous les object seront triés par l'attribut nom
  - Il est possible de trier par plusieurs attributs
  - Attention à l'ordre de tri

REQUÊTES

- NSPredicate
  - Permet de filtrer les objets
  - Language très puissant qui permet de faire des requêtes complexes
  - Création similaire au NSString

```
let taskName = "Task 1"
let predicate = NSPredicate(format: "name = %@", taskName)
```

- Exemples

```
“uniqueId = %@”, “1233324”
“firstname contains[c] %@”, (String)
“department.name = %@”, (String )
```

Voir la documentation Apple pour plus d’information

REQUÊTES

- Exécuter la requête
  - Retourne nil en cas d'erreur
  - Retourne un array vide s'il n'y a pas d'objets qui correspondent à la requête
  - Retourne un array de NSManagedObject s'il y a au moins un objet qui correspond
  - Penser à toujours gérer les erreurs

```
var error: NSError?
let fetchedObjects = managedObjectContext.executeFetchRequest(fetchedRequest, error: &error)
as [Task]?
if let results = fetchedObjects {
    return results
} else {
  println("Could not fetch \(error), \(error?.userInfo)”)
  return nil
}
```

REQUÊTES

- Faulting
  - Les objets retournés lors d'une requêtes ne sont pas forcément en mémoire
  - Core Data les charge en mémoire au moment où le programme essaie d'y accéder
  - Ceci pour des raisons d'optimisation
  - Attention à ceci

```
for task: Task in results {
    println("Task \(task)")
}
```

  - Il se pourrait que les attributs apparaissent comme "unfaulted object"
  - Pour voir le nom par exemple, il faudra faire

```
for task: Task in results {
    println("Task \(task.name)”)
}
```

  - Ceci chargera toutes les données

PROJET

- Créer application de gestion de listes de taches
- Catégorie : Nom, Picto (Prédéfinis)
- Tâche : Titre, Description, Photo, Catégorie, Date
- L'application devra au moins permettre de gérer une liste de tâches et de catégorie :
  - Les cellules devra afficher les informations relatives aux tâches (Titre, Description, Photo, Catégorie, Date)
  - Tris : Date, Nom, Catégorie
  - Groupement par catégorie, date ou lettres alphabétiques
  - Il sera possible à l'aide d'un bouton d'accéder à la une vue avec les informations de l'auteur
- Il faudra pouvoir ajouter / supprimer / mettre à jour une catégorie / tâche

PROJET

- Libre à vous d'avoir l'interface que vous voulez
- Attention aux crashs
- Une application fluide est un vrai plus
- Codez proprement
- Laissez place à votre imagination
- William Antwi – william@appsolute.fr