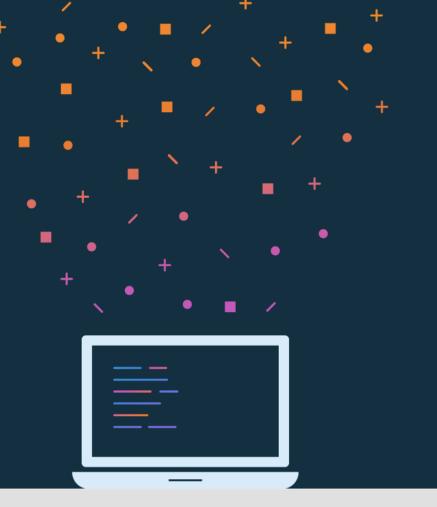


Lesson 12:
Repository pattern and WorkManager



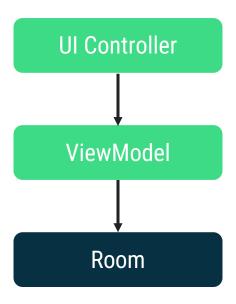
#### **About this lesson**

#### Lesson 12: Repository pattern and WorkManager

- Repository pattern
- WorkManager
- Work input and output
- WorkRequest constraints
- Summary

# Repository pattern

## **Existing app architecture**



## Relative data speeds

Operation	Relative speed
Reading from LiveData	FAST
Reading from Room database	SLOW
Reading from network	SLOWEST

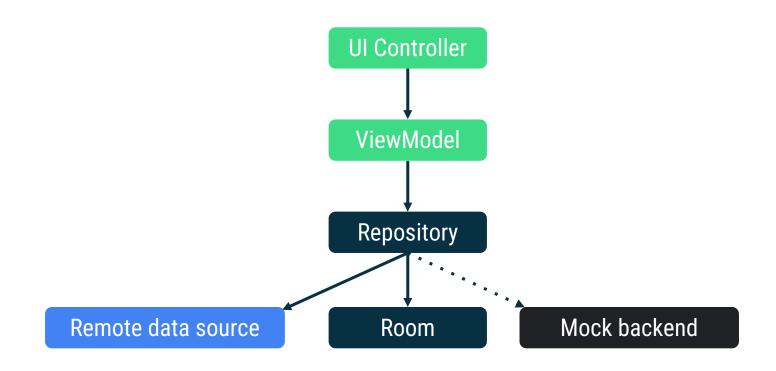
### Cache network responses

- Account for long network request times and still be responsive to the user
- Use Room locally when retrieval from the network may be costly or difficult
- Can cache based on the least recently used (LRU) value, frequently accessed (FRU) values, or other algorithm

#### Repository pattern

- Can abstract away multiple data sources from the caller
- Supports fast retrieval using local database while sending network request for data refresh (which can take longer)
- Can test data sources separately from other aspects of your app

### App architecture with repository pattern





#### Implement a repository class

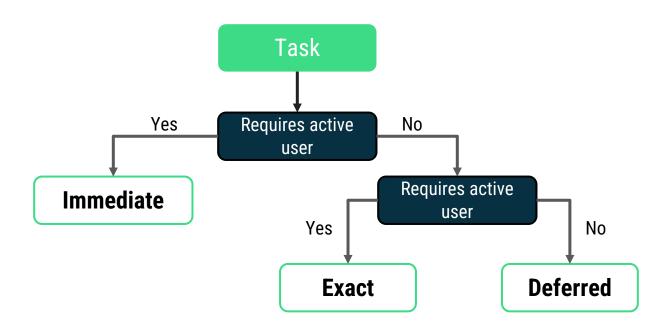
- Provide a common interface to access data:
  - Expose functions to query and modify the underlying data
- Depending on your data sources, the repository can:
  - Hold a reference to the DAO, if your data is in a database
  - Make network requests if you connect to a web service

## WorkManager

#### WorkManager

- Android Jetpack architecture component
- Recommended solution to execute background work (immediate or deferred)
- Opportunistic and guaranteed execution
- Execution can be based on certain conditions

### When to use WorkManager



### Declare WorkManager dependencies

implementation "androidx.work:work-runtime-ktx:\$work\_version"

#### Important classes to know

- Worker does the work on a background thread, override doWork() method
- WorkRequest request to do some work
- Constraint conditions on when the work can run
- WorkManager schedules the WorkRequest to be run

#### Define the work

```
class UploadWorker(appContext: Context, workerParams: WorkerParameters) :
       Worker(appContext, workerParams) {
    override fun doWork(): Result {
       // Do the work here. In this case, upload the images.
       uploadImages()
       // Indicate whether work finished successfully with the Result
       return Result.success()
```

#### **Extend CoroutineWorker instead of Worker**

```
class UploadWorker(appContext: Context, workerParams: WorkerParameters) :
       CoroutineWorker(appContext, workerParams) {
   override suspend fun doWork(): Result {
       // Do the work here (in this case, upload the images)
       uploadImages()
       // Indicate whether work finished successfully with the Result
       return Result.success()
```

#### WorkRequests

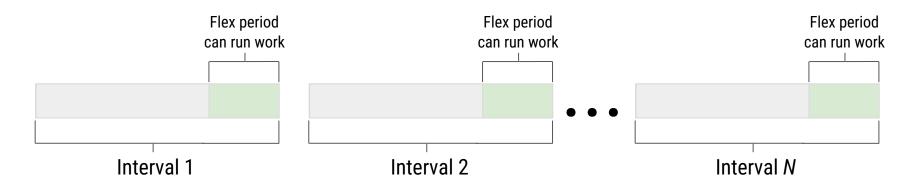
- Can be scheduled to run once or repeatedly
  - o OneTimeWorkRequest
  - PeriodicWorkRequest
- Persisted across device reboots
- Can be chained to run sequentially or in parallel
- Can have constraints under which they will run

#### Schedule a OneTimeWorkRequest

```
Create WorkRequest:
val uploadWorkRequest: WorkRequest =
   OneTimeWorkRequestBuilder<UploadWorker>()
       .build()
Add the work to the WorkManager queue:
WorkManager.getInstance(myContext)
    .enqueue(uploadWorkRequest)
```

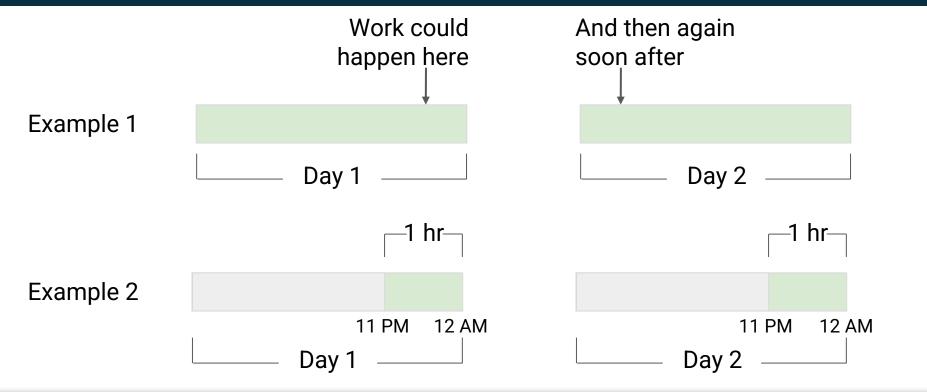
### Schedule a PeriodicWorkRequest

- Set a repeat interval
- Set a flex interval (optional)



Specify an interval using TimeUnit (e.g., TimeUnit.HOURS, TimeUnit.DAYS)

#### Flex interval



### PeriodicWorkRequest example

## Enqueue periodic work

```
WorkManager.getInstance().enqueueUniquePeriodicWork(
     "Unique Name",
     ExistingPeriodicWorkPolicy.KEEP, // or REPLACE
     repeatingRequest
)
```

## Work input and output

#### **Define Worker with input and output**

```
class MathWorker(context: Context, params: WorkerParameters):
      CoroutineWorker(context, params) {
    override suspend fun doWork(): Result {
        val x = inputData.getInt(KEY X ARG, ∅)
        val y = inputData.getInt(KEY Y ARG, ∅)
        val result = computeMathFunction(x, y)
        val output: Data = workDataOf(KEY RESULT to result)
        return Result.success(output)
```

## Result output from doWork()

Result status	Result status with output
Result.success()	Result.success(output)
Result.failure()	Result.failure(output)
Result.retry()	

#### Send input data to Worker

## WorkRequest constraints

#### Constraints

- setRequiredNetworkType
- setRequiresBatteryNotLow
- setRequiresCharging
- setTriggerContentMaxDelay
- requiresDeviceIdle

#### **Constraints example**

```
val constraints = Constraints.Builder()
    .setRequiredNetworkType(NetworkType.UNMETERED)
    .setRequiresCharging(true)
    .setRequiresBatteryNotLow(true)
    .setRequiresDeviceIdle(true)
    .build()
val myWorkRequest: WorkRequest = OneTimeWorkRequestBuilder<MyWork>()
    .setConstraints(constraints)
    .build()
```

# Summary

#### Summary

#### In Lesson 12, you learned how to:

- Use a repository to abstract the data layer from the rest of the app
- Schedule background tasks efficiently and optimize them using WorkManager
- Create custom Worker classes to specify the work to be done
- Create and enqueue one-time or periodic work requests

#### Learn more

- Fetch data
- Schedule tasks with WorkManager
- Define work requests
- Connect ViewModel and the repository
- Use WorkManager for immediate background execution

### **Pathway**

Practice what you've learned by completing the pathway:

Lesson 12: Repository pattern and WorkManager

