NEW SCHOOL LIBRARIES - CALLABLES, EXECUTORS

JAVA SUPPORT FOR CONCURRENCY IMPROVED DRAMATICALLY WITH NEW FEATURES ADDED IN JAVA 5.0

CALLABLE

IS A NEW INTERFACE SIMILAR TO RUNNABLE, USED TO SPECIFY CODE TO RUN ON A NEW THREAD, BUT WITH 2 MAJOR IMPROVEMENTS OVER RUNNABLE

EXECUTORS

ARE A HIGH-LEVEL ABSTRACTION FOR THREADS. THIS MEANS A PROGRAMMER NEED NEVER DIRECTLY WORK WITH THREAD OBJECTS NOW

THREAD POOLS

ANY SERIOUS THREADING NEEDS A LOT OF THREADS, AND IN THE OLD DAYS PROGRAMMERS HAD TO BUILD THEIR OWN 'THREAD BANKS'

LOCK OBJECTS

ALL JAVA OBJECTS HAVE AN INTRINSIC LOCK, BUT LOCK OBJECTS HAVE A WAY TO TRY AND ACQUIRE, AND BACK OFF IF DOING SO WOULD CAUSE LIVELOCK, DEADLOCK ETC

CONCURRENT COLLECTIONS

ATOMIC VARIABLES

OLD SCHOOL MULTI-THREADING

IMPLEMENT THE RUNNABLE INTERFACE

IN THE RUN() METHOD OF YOUR RUNNABLE CLASS,
PLACE WHATEVER YOU WOULD LIKE DONE ON
A DIFFERENT THREAD

CREATE A THREAD OBJECT AND HAVE THE RUNNABLE RUN ON THAT THREAD

A THREAD OBJECT IS INSTANTIATED (PASSING IN
THE RUNNABLE IN THE CONSTRUCTOR) AND
THEN THREAD.RUN IS CALLED

IF YOU NEED TO INTERRUPT THE THREAD MIDWAY..

...CALL THREAD.INTERRUPT, AND HAVE THE RUNNABLE HANDLE
THIS EXCEPTION APPROPRIATELY

THREAD.JOIN TO WAIT FOR THE THREAD TO FINISH

AND RELY ON SHARED MEMBER VARIABLES
TO CONSUME THE RESULTS

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MODERN MULTI-THREADING

IMPLEMENT THE CALLABLE INTERFACE

CALLABLE HAS 2 ADVANTAGES OVER RUNNABLE

1. IT IS A GENERIC CLASS THAT EXPLICITLY RETURNS THE THREAD RESULT (SO NO SHARED MEMORY TO BE RELIED UPON)
2. IT CORRECTLY PASSES EXCEPTIONS FROM ONE THREAD TO ANOTHER (MORE BELOW)

SUBMIT THE CALLABLE TO AN EXECUTOR OBJECT, AND GET A FUTURE OBJECT AS THE RESULT

AN EXECUTOR OBJECT IS AN ABSTRACTION TO ONE OR MORE THREAD OBJECTS. FOR INSTANCE, USING EXECUTORS, IT IS POSSIBLE TO SUBMIT THE CALLABLE OBJECT TO A THREAD POOL (RATHER THAN HAVING TO IMPLEMENT A THREAD POOL AFRESH)

EXECUTOR IS AN EXCELLENT ABSTRACTION FOR THREAD POOLS, WHICH WERE WIDELY USED, BUT EASY TO GET WRONG

THERE ARE BUILT-IN EXECUTORS FOR COMMON USAGE TYPES

FUTURE.GET TO WAIT FOR THE CALLABLE TO FINISH RUNNING

THIS IS A BLOCKING CALL, IE IT WILL SIMPLY WAIT UNTIL THE UNDERLYING CALLABLE.CALL HAS FINISHED RUNNING

FUTURE.GET WILL ALSO RELAY ON ANY EXCEPTION THROWN IN THE CALLABLE. THIS IS A HUGE DEBUGGING AID

IF YOU NEED TO INTERRUPT THE OPERATION MIDWAY, CALL FUTURE.CANCEL

THE FUTURE OBJECT IS A GENERIC OBJECT THAT WILL TAKE THE OUTPUT OF CALLABLE.CALL AND SEND IT BACK TO THE MAIN THREAD. CALLING FUTURE.CANCEL IS LIKE CALLING THREAD.INTERRUPT IN THE OLD WAY