Callbacks

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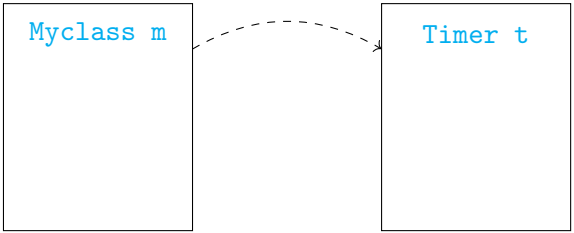
Programming Concepts using Java

Week 4

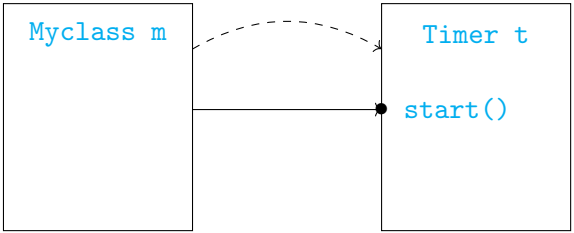
Implementing a call-back facility

- `Myclass m` creates a `Timer t`



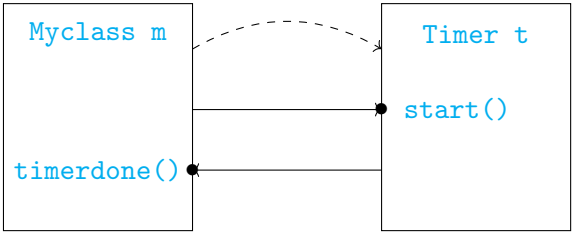
Implementing a call-back facility

- `Myclass m` creates a `Timer t`
- Start `t` to run in parallel
  - `Myclass m` continues to run
  - Will see later how to invoke parallel execution in Java!



Implementing a call-back facility

- `Myclass m` creates a `Timer t`
- Start `t` to run in parallel
  - `Myclass m` continues to run
  - Will see later how to invoke parallel execution in Java!
- `Timer t` notifies `Myclass m` when the time limit expires
  - Assume `Myclass m` has a function `timerdone()`



Implementing callbacks

- Code for `Myclass`

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public class Myclass{

  public void f(){
    ..
    Timer t =
      new Timer(this);
      // this object
      // created t
    ...
    t.start(); // Start t
    ...
  }

  public void timerdone(){...}
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Implementing callbacks

- Code for `Myclass`
- `Timer t` should know whom to notify
  - `Myclass m` passes its identity when it creates `Timer t`

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public class Timer
       implements Runnable{
  // Timer can be
  // invoked in parallel

  private Myclass owner;

  public Timer(Myclass o){
    owner = o;  // My creator
  }

  public void start(){
    ...
    owner.timerdone();
    // I'm done
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- Code for `Timer`
  - Interface `Runnable` indicates that `Timer` can run in parallel
- `Timer` specific to `Myclass`
- Create a generic `Timer`?

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- Parameter of `Timer` constructor of type `Object`
  - Compatible with all caller types

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    ((Myclass) owner).timerdone();
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```

A generic timer

- Use Java class hierarchy
- Parameter of `Timer` constructor of type `Object`
  - Compatible with all caller types
- Need to cast `owner` back to `Myclass`

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public class Myclass{

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Use interfaces

- Define an interface for callback

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    Timerowner{

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- Modify `Myclass` to implement `Timerowner`

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   implements Timerowner{

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Use interfaces

- Define an interface for callback

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public interface
    Timerowner{

  public abstract
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- Modify `Myclass` to implement `Timerowner`
- Modify `Timer` so that `owner` is compatible with `Timerowner`

```
public class Myclass
   implements Timerowner{

  public void f(){
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    Timer t =
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```

Summary

- Callbacks are useful when we spawn a class in parallel
- Spawned object notifies the owner when it is done
- Can also notify some other object when done
  - `owner` in `Timer` need not be the object that created the `Timer`
- Interfaces allow this callback to be generic
  - `owner` has to have the capability to be notified