

Week 4, Lecture 1

Introducing Arrays



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Announcements

- **1st Assignment** is due at the end of **this week**:
deadline **4pm Friday (August 20th)**.
- to submit your assignment follow the **Assignment Submission** link on the web page
- the deadline for the **first three lab assessments** is **next week (Week 5)**.

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This Week

Lecture 1: Introducing arrays

Lecture 2: Working with arrays

Java Genesis:

–**Ch5: Arrays** (Section 5.4 is optional)

Assignment 1 deadline **4pm Friday (Aug 20)**

Quick Quiz for Chapter 4

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Problem: preparing a time-sheet

We want a program to prepare time-sheets.

An employee supplies the number of days worked and the hours worked each day. The program then prints out the salary details.

In each day an employee is paid \$15/hour for the first 8 hours and \$20/hour thereafter.

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Example

An employee works for **5** days and the hours worked on these days are **9, 5, 11, 8** and **4**.

This employee's time-sheet will be:

Day	Hours	Salary
1	9	\$140
2	5	\$75
3	11	\$180
4	8	\$120
5	4	\$60

Total hours: 37

Total salary: \$575

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Introducing the array

Mathematically, could store hours worked in a sequence:

$hours = \{9, 5, 11, 8, 4\}$ where

$hours_1=9, hours_2=5, \dots, hours_5=4$

In Java a sequence is captured by an **array**.

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Arrays

An array is a data structure in which

- the elements are ordered,
i.e. a *1st*, *2nd*, ..., *nth* element where *n* is the length of the array;
- all the elements are of the same type
(the **base-type** of the array).

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Creating an array

The sequence

$hours = \{9, 5, 11, 8, 4\}$ where

$hours_1=9, hours_2=5, \dots, hours_5=4$

in Java becomes the **array**:

int [] hours = new int [5] where

hours[0]=9, hours[1]=5, ..., hours[4]=4

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```
import genesis.*;
public class TimeSheetExtra {

    public static void main (String [ ] args) {
        int days = DialogBox.requestInt("num days worked");
        int [ ] hours = new int [days];
        int [ ] salary = new int [days];
        int totalHours = 0;
        int totalSalary = 0;
        Transcript.println("Day\tHours\tSalary");
        for (int i=0; i<days; i++) {
            hours[i] = DialogBox.requestInt("hours on day "+(i+1));
            if (hours[i] <= 8) salary[i] = 15*hours[i];
            else salary[i] = 15*8 + (hours[i]-8)*20;
            Transcript.println((i+1)+"\t"+hours[i]+"\t$"+salary[i]);
            totalHours = totalHours + hours[i];
            totalSalary = totalSalary + salary[i];
        }
        Transcript.println("Total hours: "+totalHours);
        Transcript.println("Total salary: $" +totalSalary);
    }
}
```

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