

## SOFTWARE DEVELOPMENT LABS

## WEEK 2 LAB 3

1. Type in and run the following:

**ReadIntVariables.java**,  
**ReadDoubleVariables.java** and  
**ReadCharVariable.java**

Run each program several times entering different data from the keyboard each time.

2. Type in and run **HolidayCost.java**. Test your program with the following data:

Number of Travellers	Cost of Flight	Cost of Transfer	Expected Outcome	Actual Outcome
6	200	30	Flight Cost $= 6 * 200 * (1 + 0.2) = \text{£}1440$ Transfer Cost $= 6 * 30 * (1 + 0.2) = \text{£}216$ Total Cost $= 1440 + 216 = \text{£}1656$	
2	250	0		
10	445	25		

3. Write a Java application called **Circle2.java** which reads in the radius of a circle (in cms) and outputs the diameter, circumference and area.

Use the formula:

$$\text{Diameter} = 2 * \text{radius}$$

$$\text{Circumference} = 2 * \pi * \text{radius}$$

$$\text{Area} = \pi * (\text{radius})^2$$

Use the Math functions for  $\pi$  and squaring a number. Your output should have the following format:

```
The radius is 4.50 units
The diameter is 9.00 units
The circumference is 28.27 units
The area is 63.62 units squared
```

Test your program with radii 5cm, 8.25cm and 15cm.

4. Write a Java application called **Change.java**. This program should read in the cost of an item sold and the amount of money tendered by the customer, then print out the following:

<b>Amount Due :</b>	<b>£xxx.xx</b>
<b>Amount Tendered :</b>	<b>£xxx.xx</b>
<b>Change Due :</b>	<b>£xxx.xx</b>

Test your program with the following:

<b>Cost of Item</b>	<b>Money Tendered</b>
£3.99	£5.00
£10.50	£20.00
£25.00	£40.00

5. Write a Java application called **Garden.java** which finds out what area of grass there is in a garden lawn. ASSUME the garden is square with a circular pond.

The program should prompt the user to enter the length of the side of the square garden and the radius of the pond (in metres) then output the area of grass.

Test your program with the following data:

<b>Input</b>	<b>Expected Outcome</b>	<b>Actual Outcome</b>
Garden length = 6m Radius of pond = 1.2m	Garden = 36.00m <sup>2</sup> Pond = 4.52m <sup>2</sup> Lawn = 31.48m <sup>2</sup>	
Garden length = 20m Radius of pond = 5m		
Garden length = 15m Radius of pond = 2.5m		
Garden length = 10m Radius of pond = 1.25m		

6. Write a Java application called **ConvertMiles.java** which prompts the user for the number of miles they have travelled.

The program should convert this to kilometres and output the distance in kilometres to 2 decimal places. (There are 1.609 kilometres in 1 mile).

Test your program with 10, 45.6, 60 and 123.23 miles.

Miles	Kilometres
10	
45.6	
60	
123.23	

## CASE STUDY 1

### TRY THIS WITH COLLEAGUES

7. Write a Java application called **Investment.java** which prompts the user to enter how much money he wants to invest (assume a positive number is entered) and how many years he wants to invest the money for. The program should calculate the return at 5% simple interest and output the value of the investment at the end of the investment period. The output should be of the following format:

<b>Initial Investment:</b>	<b>£1000.00</b>
<b>Investment period:</b>	<b>2 years</b>
<b>Final value of Investment (at 5.00%)</b>	<b>£1100.00</b>

Test your program with £220 (2 years), £1000 (3 years), £2500 (5 years),  
£10,000 (2 years), £50,000 (4 years).

Amount	Years	Value of Investment (5%)
£220	2	
£1000	3	
£2500	5	
£10 000	2	
£50 000	4	

Change the interest rate to 3.5%, then test your program with the above data.

Amount	Years	Value of Investment (3.5%)
£220	2	
£1000	3	
£2500	5	
£10 000	2	
£50 000	4	

## CASE STUDY 2

### TRY THIS WITH COLLEAGUES

8. Write a Java application called **Rocket1.java** reads in 3 integers representing the blast-off time of a rocket expressed in hours, minutes and seconds on the 24-hour clock. Then read another integer giving the rocket's flight time in seconds. Use the data to calculate the time of day at which the rocket will return to earth and print out this time in a readable format. Your output should be of the following format:

<b>Take-off Time:</b>	<b>14:20:30</b>
<b>Flight Time:</b>	<b>20000 seconds</b>
<b>Expected Arrival Time:</b>	<b>19:53:50</b>

Test your program with the following data:

Input	Expected Outcome	Actual Outcome
Take-off Time: 10:00:00 Flight Time: 20 secs		
Take-off Time: 12:10:00 Flight Time: 400 secs		
Take-off Time: 06:50:30 Flight Time: 2000 secs		
Take-off Time: 03:47:32 Flight Time: 45678 secs		
Take-off Time: 23:00:00 Flight Time: 4000 secs		