Programming 1

Tutorial 3

# Activity 1

## Task

Ask the user for his age. If his age is less than 13, print the message “Not for kids”, or if it's greater than 19, print “You’re too old”. If his age is within the range [13, 19], show message “Welcome, teenager”.

## Expected result:

What's your age? 15

Welcome, teenager!

What's your age? 11

Not for kids!

What's your age? 20

You're too old!

# Activity 2

Leap years are years with 366 days. Write a program to check if a year is a leap year. Test your program with different years to make sure it works correctly.

## Expected result:

Enter the year: 2018

The year 2018 is not a leap year.

Enter the year: 2012

The year 2012 is a leap year.

## Instructions:

Following is the method to identify a leap year:

1. If it is not divisible by 4 (e.g. y % 4 != 0), it's not a leap year, show a message and stop. Otherwise, move on.

2. If a year is divisible by 4, but not 100, like 2012, it is a leap year, show a message and stop here. If a year is divisible by both 4 and 100, like 2000, continue.

3. If a year is divisible by 100, but not 400, like 1900, then it is not a leap year. If a year is divisible by both, then it is a leap year.

# Activity 3

## Task

Write a program to take 3 real numbers *a*, *b* and *c* from user and solve the quadratic equation:

*ax*2 + *bx* + *c* = 0

Show a message to tell the user if the equation has one, two, infinitely many roots or none, and show the value(s) of *x*.

## Expected result:

Please enter a: 2

Please enter b: 2

Please enter c: -4

The equation has two roots:

x1 = 1.0, x2 = -2.0

## Instructions:

These are the rules for solving the quadratic equation:

- If *a*, *b* and *c* are all zeros, there's nothing to be solved.

- If *a* and *b* are zeros and *c* is not, the equation has no root.

- If *a* is zero while *b* and *c* are not, there is one root:

If none of the above cases are met, we can apply the quadratic formula.

- If , the equation has no real root.

- Otherwise, there are two roots:

and

Use Math.sqrt() to calculate the square root of a number (or expression). For instance:

double x = Math.sqrt(10); // calculate square root of 10

double dsqrt = Math.sqrt(b \* b – 4 \* a \* c);

# Submission

Submit a **zip** file containing all Java programs to this tutorial’s submission box in the course website on FIT Portal.