Laboratory

Week 1

Solving quadratic equations

- We want to solve quadratic equations
    - $ax^2 + bx + c = 0$
    - with parameters a, b, and c

Solving quadratic equations

- The discriminant $b^2 - 4ac$ determines the type of solutions
  - Discriminant is positive:
    - Two real solutions
  - Discriminant is zero:
    - One real solution
  - Discriminant is negative:
    - No real solution, but two complex solutions

Solving quadratic equations

- Solution is given by
  - $$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Solving quadratic equations

- How do we program this
  - Give an explanation of the program
  - Ask user for the values of the parameters a, b, and c
  - Calculate the (root of the) discriminant
  - Calculate the two solutions
  - Print out the solution with explanation

Solving quadratic equations

- Step one:
  - Explanation

```
print("Solving a x^2 + b x + c")
```

Solving quadratic equations

- Step 2:
  - Ask for the parameters and store them as floating point numbers

```
a = float(input('Enter a: '))
b = float(input('Enter b: '))
c = float(input('Enter c: '))
```

Solving quadratic equations

- Step 3:
  - Calculate the root of the discriminant

```
discriminant_root = (b*b-4*a*c)**0.5
```

Solving quadratic equations

- Calculate the solutions
  - ```
    sol1 = (-b + discriminant_root)/(2*a)
    sol2 = (-b - discriminant_root)/(2*a)
    ```
    ```

Solving quadratic equations

- Print out the solution

```
print('The solutions of the quadratic equation are')
print(sol1)
print('\tand')
print(sol2)
```