Domain Specific Language

INGI2132 - Project

The use of emails is today present in any serious web application. However, it is quite tedious to write code to perform the required functionalities, even if there exist good APIs for that matter.

Let us consider the Oracle **JavaMail** library. Here is some Java code to send an email with that library :

```
public class SendMailExample {

   public static void main(String [] args)
   {

       // Recipient's email ID needs to be mentioned.
       String to = "abcd@gmail.com";

       // Sender's email ID needs to be mentioned
       String from = "web@gmail.com";

       // Assuming you are sending email from localhost
       String host = "localhost";

       // Get system properties
       Properties properties = System.getProperties();

       // Setup mail server
       properties.setProperty("mail.smtp.host", host);
       properties.setProperty("mail.smtp.port", "2525");

       // Get the default Session object.
       Session session = Session.getDefaultInstance(properties);

       try{
           // Create a default MimeMessage object.
           MimeMessage message = new MimeMessage(session);

           // Set From: header field of the header.
           message.setFrom(new InternetAddress(from));

           // Set To: header field of the header.
           message.addRecipient(Message.RecipientType.TO, new InternetAddress(to));

           // Set Subject: header field
           message.setSubject("This is the Subject Line!");

           // Send the actual HTML message, as big as you like
           message.setContent("<h1>This is actual message</h1>", "text/html" );

           // Send message
```

```
            Transport.send(message);
            System.out.println("Sent message successfully....");
        }catch (MessagingException mex) {
            mex.printStackTrace();
        }
    }
}
```

Clearly, it is very verbose and complex, just to send emails, a quite straightforward task from a human standpoint. However, application developer (and even non-developer) might benefit from having at their disposal an easy language to manage emails.

Goal of the Project : Your job is to develop a Domain Specific Language (DSL) in Scala to help users to use the library as efficiently as possible (from a user point of view).

Evaluation

Building a good DSL is partially an *art*. There is therefore no unique result that is expected for your work. However, there are objective criterions that still can be used to evaluate it. Here is a non-exhaustive list of criterions that will be used to evaluate your project:

- Are you using the concepts presented during the course in an appropriate way (e.g. implicit parameters and conversions, operator overload, monads, by-name parameters, closures, currying, apply and update methods).
- Is your DSL weakly coupled ? Your DSL should not modify the code of the library, i.e., your DSL has to be developed on top of it and not inside.
- How easy, elegant and flexible is your DSL ? Have you added new abstractions that were not initially provided by the library ?
- Are you hiding/removing functionalities of the library? Your DSL should not reduce the scope of problems that could be solved using the library but only provide users with an easier way to achieve specific goals.
- Is your code clean, well-indented and documented ? Are the principle of functional programming used when possible (e.g., prefer immutable over mutable state when performances are not a bottleneck) ?

Resources

- The JavaMail Library : http://www.oracle.com/technetwork/java/javamail/index.html
- On Moodle :
  - An sbt project, available on Moodle
  - The FakeSMTP application, an easy-to-use SMTP server (launch the server with the port 2525).

Deliverable

- The source code of your project in a zip file ;
- A 3 pages report. Proposal of skeleton :
  - Functionalities/specificities of your DSL ;
    - Some documented examples ;
    - Where did you used advanced DSL features and why ?
  - Conclusion, strong/weak points of your DSL, what would you do if you had more time ?
- A 5 minutes of oral presentation with slides to "sell your DSL".

Deadline

Friday, April 29th 23:59:59

Some References

- Twitter Scala School: http://twitter.github.io/scala_school/
- Functional Programming in Scala on Coursera: https://www.coursera.org/course/progfun
- Scala for the Impatient: available at the BST
- The assistant : sascha.vancauwelaert@gmail.com