UNIVERSITY OF
LIVERPOOL

MAY 2007 EXAMINATIONS

Bachelor of Arts : Year 3
Bachelor of Engineering : Year 3
Bachelor of Science : Year 3
No qualification aimed for : Year 1

Software Development Tools

TIME ALLOWED : Two and a Half Hours

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions in Section A.
Answer **FOUR** questions in Section B.

If you attempt to answer more questions than the required number of questions (in any section), the marks awarded for the excess questions answered will be discarded (starting with your lowest mark).

Section A

1. Ant

    (a) What will the Ant tasks below produce on a console?

    ```
    <property name="build.debug" value="off"/>
    <echo message="build.debug = ${build.debug}"/>
    <property name="build.debug" value="on"/>
    <echo message="build.debug = ${build.debug}"/>
    ```

    Which general phenomenon is demonstrated by this example? Are there exceptions from this phenomenon?

    4 marks

    (b) What action does the following command perform?

    ```
    >ant -propertyfile build.properties
    ```

    What is an alternative way of performing the same action from inside the build file? What is `build.properties`? Give an example for the elements of `build.properties`.

    5 marks

    (c) Describe the action of a `<javac>` Ant task in general, and, in particular, within the following target:
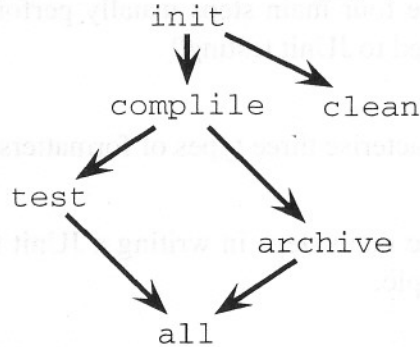
    ```
    <target name"compile" unless="A">
       <javac srcdir="src" destdir="build/classes"/>
    </target>
    ```

    Explain which files are affected by this action and how.

    5 marks

(d) i. Present a build file `build.xml` (which for simplicity contains no real tasks) with `test` the default target and whose dependency graph of targets has the form

```
              init
             ↙    ↘
      complile      clean
        ↙              ↘
    test              archive
        ↘              ↙
              all
```

ii. Which targets mentioned in 1(d)i above will be executed in the following three cases of running Ant from the command line and and in which order will they be executed?

    A. `>ant`

    B. `>ant clean archive test`

    C. `>ant all`

In each case give the necessary explanations.

                      7 marks

(e) Let `src` and `srcback` be two subdirectories of the same default base directory. Present an Ant target which copies all `*.java` files under directory `src` at any depth to the directory `srcback` while at the same time inserting the current date in the name of the resulting files.

                      8 marks

2. Testing

    (a) What are the four main steps usually performed by Ant build process (i.e. by Ant targets) related to JUnit testing?

<div align="right">4 marks</div>

    (b) Briefly characterise three types of formatters used for capturing test results in Ant.

<div align="right">3 marks</div>

    (c) List the three main steps in writing a JUnit test case, and illustrate the process by a simple example.

<div align="right">8 marks</div>

    (d) List six assertion methods (each in two existing versions) allowed in test cases.

<div align="right">4 marks</div>

    (e) What is the role of the two additional methods `setUp()` and `tearDown()` typically used in a JUnit test case?

<div align="right">5 marks</div>

    (f) Why is the `<batchtest>` tag better to use than multiple `<test>` tags? Give an example for the use of the `<batchtest>` tag.

<div align="right">7 marks</div>

Section B

1. Describe

   - a system of directories, and
   - two simplest build files:
     - `master.xml`, in one directory, and
     - `build.xml` in another directory,

   each having one target containing only `<echo>` tasks

   in such a way that

   - `master.xml` should call `build.xml`,
   - `master.xml` should pass a property to the file called, and
   - `<echo>` messages in `build.xml` should show on run time
     - which build file is running, and
     - the value of the property passed by `master.xml`.

   10 marks

2. Give an example of an Ant task executing a Java class with arguments. State five benefits of executing a Java program from inside Ant. **10 marks**

3. What can prevent the generation of an HTML report before a build fails, and how can this problem be resolved? In the solution of the problem, the build should still fail if one of the tests fails.

   10 marks

4. Give a general description of Eclipse.

   10 marks

5. Describe the essential steps, advantages, and peculiarities of creating and running a JUnit test case in Eclipse.

   10 marks

6. Describe the essential steps, advantages, and peculiarities of creating and running an Ant build file in Eclipse.

   10 marks

7. List, characterise and compare the most essential features of four different types of automated testing, and state corresponding examples of testing tools together with a brief characterisation. **10 marks**