

OLLSCOIL NA hÉIREANN, GAILLIMH
NATIONAL UNIVERSITY OF IRELAND, GALWAY

Summer Examinations 1999

OBJECT ORIENTED PROGRAMMING AND INTERNET PROGRAMMING
[CS424]

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Time allowed: *Two hours.*

Answer *four* of the following problems.

1. JAVA.

- (a) Write a JAVA application or a JAVA applet that displays the string

"Hello, world!"

and starts a new line. Explain the differences between applets and applications in JAVA.

- (b) Describe the steps involved in the process of creating and running a JAVA application. How can you include an applet in an HTML page?
- (c) Describe the relation between objects and classes in JAVA.

2.

- (a) Give two examples of JAVA widgets that can be used in a graphical user interface. For each such example, name and describe one important method.
- (b) Describe, in your own words, the concept of Visual Design. What JAVA classes can be used to facilitate the process? How do they interact?
- (c) Explain the function of a constructor in JAVA and illustrate this by an example.

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3.

- (a) Imagine that you were writing a Time class to store and manipulate times. Suppose that the class looks like below. Write the constructor method Time which sets h, m, and s to represent the number of hours, minutes, and seconds equivalent to the number of seconds start.

```
class Time {
    private int h, m, s;    // hours, minutes, seconds.

    public Time(int start) {
        ...
    }
    ...
}
```

- (b) Write a Time method public void add(Time t) which adds t to this time object.
- (c) Explain the reason for the private access to h, m, and s. Describe two more constructors and three more methods that would be useful for this class.

4. HTML.

- (a) Describe the general structure of an HTML document. What does HTML stand for? Describe the syntax of an HTML tag and give an example of how it is used.
- (b) Describe the function and form of an http URL. Explain the difference between absolute and relative URLs. What does the acronym URL stand for?
- (c) Write a complete HTML document that
- (i) has the title "Suzie and her dog";
 - (ii) contains a link to a document about dog food in a file 'dogfood.html' in the same directory;
 - (iii) includes an image file 'dog.jpeg'.

5. Perl.

- (a) Describe how to run a Perl script in a UNIX environment. How must the file containing the script be prepared?
- (b) Write a Perl program that prompts for and reads two numbers and then prints out their product.
- (c) Name the basic data types in Perl. Give three examples of operators. Use one of the examples to illustrate how the behaviour of Perl operators depends on the context.

6. Regular expressions.

- (a) Given the regular expression

$$r = (a|b)^+a(bb)^*$$

over the alphabet $A = \{a, b\}$, describe the language L defined by r . Give two examples of words in L and one example of a word not in L . Design a finite state machine that accepts L .

- (b) Name and describe the three basic operations that make a new regular expression out of given ones.
- (c) What does the Perl regular expression

$$/\backslash b(\backslash w^+)(\backslash s^+\backslash 1)^+\backslash b/$$

describe? Describe the meaning and function of the constituents of this regular expression.