CENTER FOR TEXTUAL STUDIES AND
DIGITAL HUMANITIES

Introduction to Digital Humanities Research & Computing

Fall Semester 2015

Week 6

Discussion

Newton Project

Getting started with programming

- what do you need to get started?

    - choose an OS
    - choose a preferred editor
    - select your programming language
    - compiler will be relative to the selected language

Getting started with programming

eg: Java programming

- A Java compiler and virtual machine
    - available from www.java.com
- An editor such as Eclipse
    - available from www.eclipse.org

Getting started with programming

eg: PHP programming

- a basic text editor to create and save .php files
    - eg: TextWrangler or BBEdit on OS X...

- a PHP enabled web server, such as Apache 2 with PHP support
    - XAMPP

- a web browser to view the output

Getting started with programming

- describe how programming works

- employ examples from various different languages

- begin practicing and initial programming with a specific language

Getting started with PHP programming

- PHP:Hypertext Preprocessor

- server-side language
  - PHP code is executed on the server

- support for many different databases including MySQL, PostgreSQL...

- open source software
  - free to download and use
  - included with LAMP stacks, XAMPP test packages...
  - http://www.php.net

Getting started with PHP programming

- runs on multiple platforms including Linux, OS X, Windows, Unix...

- compatible with many web servers such as Apache, IIS...

- files can include different content such as
    - text, HTML tags, scripts, styling...

- PHP files are interpreted by a server and returned to the browser as plain HTML

- files normally end in .php

Getting started with PHP programming

```
<?php
?>
```

- can be stand-alone or embedded in HTML, for example

```
<html>
<body>
<?php
echo "Hello World, how are you?";
?>
</body>
</html>
```

- each code line or grouping must end with a semi-colon
    - distinguishes one set of instructions from another

Alternative methods for writing programs

Spaghetti programming - no real plan

- code first, ask questions later
- modification increases the requirement for ease of understanding
- take care how and where you modify code
- no structure = mess of code
- large number of collaborators compounds this problem

Alternative methods for writing programs

Spaghetti programming - GOTO command

- BASIC programming language most closely associated with Spaghetti programming
- GOTO commands told the computer to 'go to' another part of the program
- the code jumps from one part to another

Alternative methods for writing programs

Spaghetti programming - GOTO command

```
10 GOTO 50
20 PRINT "THIS LINE PRINTS SECOND"
30 END
40 GOTO 20
50 PRINT "THIS LINE PRINTS FIRST"
60 GOTO 40
```

- the code becomes increasingly hard to read, modify, and understand

Alternative methods for writing programs

Structured programming - planning ahead

- keep a program organised from the start

- teaches programmers that a program can be divided into 3 distinct parts

- SEQUENCES
- BRANCHES
- LOOPS

Alternative methods for writing programs

A PHP loop example:

```
for ($x=1; $x<=5; $x++)
{
    echo ‘X = ’.$x.’<br>’;
}
```

DVD playback options for a movie using a

- sequence
- branch
- loop

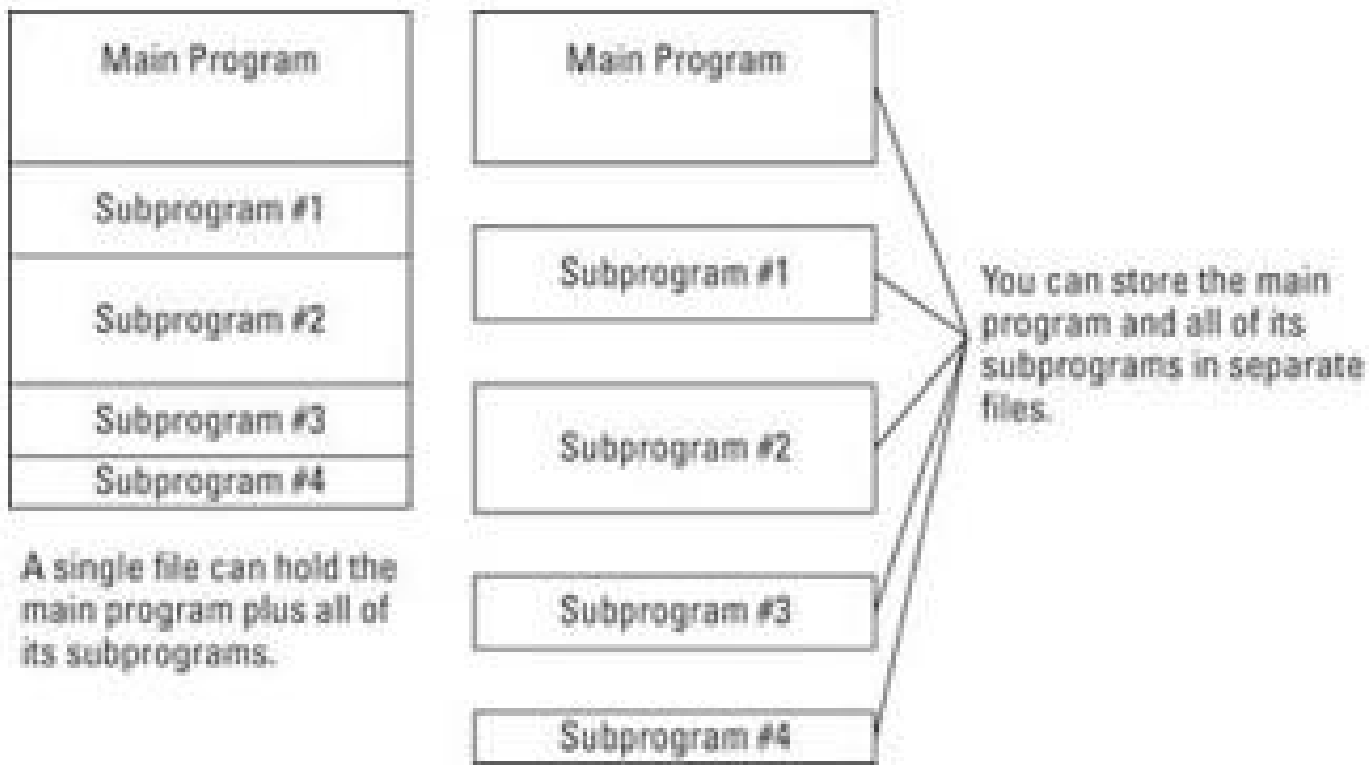
Alternative methods for writing programs

Top-down programming

- dividing a large program into smaller parts
    - easier to manage
    - each part performs a specific task
- identify main (top) task for the program to solve
- identify smaller sub-programs within the larger program
- smaller modules building the larger whole
- larger program consisting of many subprograms
- store subprograms in either
    - one file
    - separate, multiple files (this is often the preferred option)

Alternative methods for writing programs

Top-down programming



Alternative methods for writing programs

Object-Oriented Programming

- Java is an Object-Oriented Programming (OOP) language
- another technique for dividing large programs into manageable parts
- solves two obvious issues with structured programming
    - reusability
    - modelling
- reusability in OOP with objects

Alternative methods for writing programs

The issue of landing a spaceship on the moon!

NASA orbiter error

Alternative methods for writing programs

Object-Oriented Programming - Objects and division

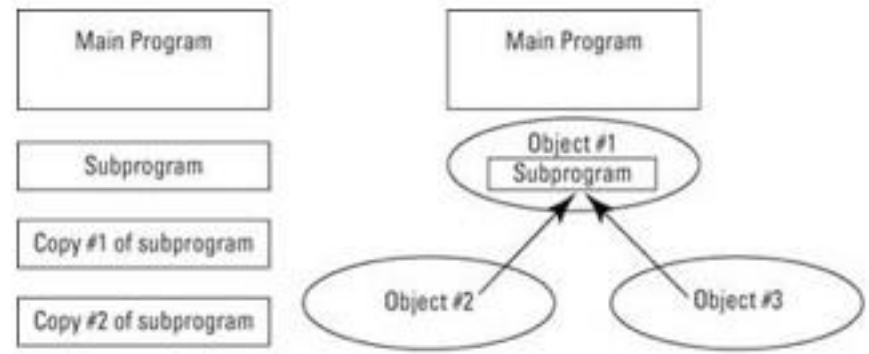
- OOP avoids this issue by issuing objects
- objects combine data and the commands that manipulate them
- OOP divides a large program into real life objects

Think about landing on the moon using an OOP design.

Alternative methods for writing programs

Object-Oriented Programming - Objects and modifications

- objects simplify modification
- objects also permit code reusability
- more efficient and easier than sharing sub-programs
- sub-programs can compound errors
- inheritance in OOP
- OOP never physically copies a sub-program but 'points to' or 'inherits'



Copying a subprogram creates multiple copies of that subprogram.

Instead of making copies of a subprogram, objects "inherit" a subprogram. This leaves a single copy of a subprogram that can be used in multiple objects.

Alternative methods for writing programs

Object-Oriented Programming

- makes programs easier to write
- easier to understand
- easier to modify
- these advantages allow a programmer to focus more on solving problems

Online research exercise

Jules Verne

- find as many different editions of

Around the World in Eighty Days
Twenty Thousand Leagues Under the Sea
Journey to the Centre of the Earth
From the Earth to the Moon

- record availability, copyright notice, PDF download option, original source for digitised copy...
- English language and French language editions.

- add information to collaborative spreadsheet