Heriot-Watt University Tutor Handbook

BSc Praxis: Internet Technology

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Heriot-Watt University Tutor's Handbook: Praxis

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Contents

Topic 1

Introduction

Note:

The tutor notes for all topics of this module have been developed with the novice tutor in mind and may be more comprehensive than you need.

Praxis Organisation

This unit is heavily dependent on students sharing information and giving feedback to each other. Each student should be allocated to a small tutorial group of no more than nine students. Each tutorial group should be led by a tutor who maintains regular contact with the students, monitoring their progress and fielding any questions they might have.

The primary means of communication and interaction for the students is expected to be weekly face-to-face meetings of their tutorial group. Secondary mechanisms could include e-mail, newsgroups, bulletin boards, chat rooms, web sites, etc. in support of this.

Each topic in the unit assigns a task (with up to three compenents) to each member of a tutorial group. The topics for investigation will be different for each member of the group and members are identified by number (1st tutee, 2nd tutee, etc.). It is assumed that there is a membership list for each tutorial group from which the tutees can determine their number. Students will learn about other topics from fellow tutees in their tutorial group meetings.

The tutorial group meetings at which the students present the material from their assigned tasks should be held about a week after each topic has been started. Just before the next topic commences is preferable. There will be seven such meetings since no meeting is required after last topic.

There are three formal assessments, each carrying one-third of the marks for the unit.

The first two coursework submissions are 1000 word essays and should be submitted at the tutorials associated with Topics 3 and 5 (but at the very latest, before the tutorials associated with Topics 4 and 6). Prompt feedback should be provided on the first coursework submission to inform the students' production of the second one.

The third coursework submission is a formal presentation which each tutee makes to the rest of their group in one of the last two tutorials (those associated with Topics 6 and 7). About half of the group should present on each occasion. These presentations should be assessed by the tutor.

Praxis Schedule

Topic 1	Online	Introduction to praxis
	Tasks	For presentation at first tutorial 1. Look up and write down dictionary definition of "praxis" 2. Write a paragraph on its meaning in context of your course
	Tutorial	Individual reports on meaning of "praxis" Group discussion of reports
Topic 2	Online	Reporting information (written and spoken)
	Tasks	1. Read CKR Background materials and Article 1 before next topic 2. Prepare material on first assigned topic for next tutorial
	Tutorial	Individual reports on first assigned topic Discuss material presented
Topic 3	Online	"The Case of the Killer Robot" [CKR] CKR - Background to the case study & Article 1
	Tasks	1. Read CKR Article 5 before next topic 2. Expand first assigned topic and submit as Coursework Submission A 3. Identify about 3 key points from Coursework Submission A for next tutorial
	Tutorial	Present key points from Coursework Submission A Discuss material presented for Coursework Submission A
Topic 4	Online	Analysis and Specification CKR - Article 5 (Requirements Specification)
	Tasks	1. Submit Coursework Submission A (last chance) 2. Read CKR Articles 2, 3 & 4 before next topic 3. Prepare material on second assigned topic for next tutorial
	Tutorial	Individual reports on second assigned topic Discuss material presented

Topic 5	Online	Design and Development CKR - Articles 2, 3 & 4 (Software Development in Teams)
	Tasks	1. Read CKR Articles 6, 7 & 8 before next topic 2. Expand second assigned topic and submit as Coursework Submission 2 3. Identify about 3 key points from Coursework Submission 2 for next tutorial
	Tutorial	Present key points from Coursework Submission 2 Discuss material presented for Coursework Submission 2
Topic 6	Online	Testing and Usability CKR - Articles 6, 7 & 8 (Software Testing and Usability Evaluation)
	Tasks	1. Submit Coursework Submission 2 (last chance) 2. Read CKR Article 9 before next topic 3. Prepare material on third assigned topic for next tutorial
	Tutorial	Present Assignment 3 (first half of tutorial group)
Topic 7	Online	Ethics and Culpability CKR - Article 9 (Ethics)
	Tasks	1. Think about the issues involved in deciding who was at fault in CKR. 2. Make sure you attend the second set of presentations.
	Tutorial	Present Coursework Submission 3 (second half of tutorial group)
Topic 8	Online	Computer Architectures and Organisation
	Task	1. Think about the future possibilities for computer architectures.
	Tutorial	None

End of Unit

What is Praxis?

Praxis is where we introduce new students to the accepted practices or customs of their particular discipline and to what we expect of students in general. Here we get students into the habit of finding things out for themselves. The things we ask them to find out about are drawn from all over their degree subject area. We help students think about what they have discovered and organise this information both in their minds and on paper/slides. We assess a series of written submissions and oral presentations for quality of both content and presentation.

Tutorial times

The tutorials should be scheduled for a regular one hour slot each week. Tutorials will relate to successive Topics within the Unit. Students should be given time to work through the on-line materials and achieve the assigned tasks prior to each tutorial. So, for instance, students might be instructed to start work on the on-line material for a Topic immediately after the tutorial for the previous Topic.

Who does what?

Tutees: Your tutees will be given tasks in the on-line material and be asked to report their findings in their next tutorial. The tutorials are a forum for discussion of the material they produce.

Tutors: The tutor's role is to lead the discussion. Tutors will also be expected to provide helpful feedback on the correctness and presentation of the tutees' material and assess short assignments. You will need to prepare for your tutorials beforehand (see below). The information you will need for your tutorials will be provided by the on-line materials and these Tutor Notes, both of which you should familiarise yourself with before each tutorial. Between them they should supply you with all the background information you will need.

Getting to know your tutees

Break the ice by telling them a bit about yourself - not just your academic credentials but where you come from and things like that.

Go around the group getting them to introduce themselves, saying, for instance, why they chose this course and where they come from. Try to identify the shy ones and the outspoken ones at this stage. Try to make a link between you and each of them individually with a comment about what they say. This is especially important with those who seem a little shy.

Making your tutees aware of your expectations

Remember that the tutorial accounts for a small proportion (perhaps 10%) of the time which your tutees should be spending on the Praxis Unit each week. Make sure that they appreciate the need to put in the non-tutorial time (perhaps 90%) researching and organising material for presentation at the tutorials.

Attendance

Attendance at tutorials is obligatory. Make this clear to any tutees who absent themselves from a tutorial. You should create an attendance sheet which you can use to record who was present each week.

Prior Tasks

The on-line materials will instruct your tutees to undertake various tasks prior to each tutorial. This will have resulted in the production of written material and/or presentations. Make it quite clear to any tutee who does not bring such material to the tutorial that this is completely unacceptable. Collect the material at the end of the tutorial and return it at the next tutorial with some written feedback on content, style, presentation, etc. The written feedback will not only help your tutees to learn, it will also add to the importance they attach to the submissions and encourage the tutees to take their preparation more seriously. You can use your attendance sheet to record whether the requisite prepared

material was brought to the tutorial each week.

Mumblers

Shy students will tend to mumble. Remember that if you cannot work out what they are saying then the rest of the group probably cannot either. Do not be afraid to ask tutees to repeat things, as many times as necessary. Remember that you are the person running the tutorial so your tutees must make themselves intelligible to you. If they do not then the tutorial will not work so be confident and persistent in asking them to repeat things which you cannot make out.

Courtesy

I hope you will not have any problems with this but in the heat of discussion harsh/rude words can sometimes be exchanged between tutees. Do not let this go unchallenged. If it happens stop the discussion and explain to all of your tutees that courtesy is essential in any civilised discussion.

Balance

Leading a tutorial discussion is a balancing act -

- *Asking the group a question versus Asking a specific individual*

  Avoid picking on individuals if you can.

  Beware of directing questions to the group as a whole - you might get a deafening silence or you might get the same person responding all the time. Shy tutees will collude in this.

  As the group gets to know each other they will become more confident so do not give up on asking the group just because it did not work well in the first session.

- *Letting tutees run with a topic versus Guiding them towards crucial points*

  Try not to monopolise the discussion yourself. They will be happy to let you do this because it will save them from thinking. You must make them think!

  Always let the tutees direct the discussion to start with - ask leading questions to get the ball rolling if necessary.

  If the discussion goes in the direction you want then that is fine.

  If it goes off at a tangent that will not let them meet issues you consider important try to dream up a question that gets them back on course.

- *Letting tutees learn from each other versus Making sure they get the right information*

  Be careful about correcting incorrect statements made by your tutees. There will be plenty of these but you must not overdo it and dissuade them from contributing.

  Only correct serious errors that might mislead the group at a later date.

  Try not to say "You are wrong"; turn correction into a discussion as in "What do the rest of you think about that?"

- *Encouraging the shy to participate versus Alienating them by picking on them*

  A tricky one this. Go gently.

  Do not expect everybody to contribute in the first tutorial.

  Gradually work the shy ones into discussions with the odd question directed to them specifically (they will expect this anyway).

Do a lot of running around the group getting everybody to contribute something in turn.

- *Discouraging the monopolists versus Alienating them by shutting them up*

  Monopolists can be a pain but they can also be very useful.

  They tend to abhor silence so they actually make it easier to ask the group things.

  Once they have answered you can ask the rest what they think - they will be much more forthcoming once somebody else has already said something.

  Controlling monopolists once the discussion has taken off is very difficult though.

  Interjecting with questions directed specifically at another individual can limit the damage done **by** monopolists but watch out for signs of damage **to** them.

On Praxis

You do not have to spin the tutorial out to last the whole hour. If the discussion dries up and all of the key points have been covered then let the group go. This first tutorial could well end early. If it does not even run to thirty minutes though, try asking them a bit more about how they are settling in or telling them a bit more about your work.

This first tutorial is mainly a "getting to know each other" session.

Introduce yourself and tell them a bit about yourself - where you come from, where you studied previously and what.

Go around the group asking each tutee in turn to say who they are, where they come from and why they chose to study this course.

Each of your tutees will have been instructed to bring to the tutorial written work (hand-written is OK for now) covering two things:

1. What is the dictionary definition of *praxis*?

   Oxford English Dictionary:

   Accepted practice, custom; practising of an art etc.

   Comes from the Greek for "doing".

2. What do you think praxis means in the context of your degree?

   Answers to this could vary widely but your tutees will hopefully have identified some customs relating to acceptable student behaviour on the one hand and professional practice in their subject area on the other. You should try to get them to identify some of the following customs and practices and make the conceptual leap to Codes of Conduct, Standards and Statute Law.

   Being a University Student

   - Self-motivated study
   - Time management
   - Meeting coursework deadlines
   - Attendance at lectures, tutorials, laboratories
   - Honesty and integrity

- Respect for buildings and equipment

Their Degree Discipline

- Responsible use of E-mail, Newsgroups, WWW
- Acceptable forms of coursework submission
- Algorithm development and implementation
- Information Technology
- Management accounting

"In-House" Styles

- Layout of source code in computer programs
- Design/Development Methodologies (SSADM, Waterfall, UML)

Professional Standards

- Codes of Conduct (E.g. British Computer Society)
- ***Behaving*** in a professional manner
- Codes of Practice (E.g. British Computer Society)
- Doing a***competent*** job

International Standards

- ISO 9000 Total ***Quality*** Management
- Actually in 3 parts - ISO 9001, ISO 9002, ISO 9003
- There is a software system for certification called *TickIT*
- BS 7799 Information ***Security*** Management Systems
- In 2 parts - A code of Practice and a Guide for Specification
- There is a certification scheme called *c:cure*

Statute Law

- Contracts, Torts, Restitution
- Consumer Protection
- Intellectual Property Rights
- Data Protection
- Computer Misuse

Topic 2

Reporting Information

Assigned Topics 1 - 9

Each of your tutees has been assigned a different topic from the list below. They have been told that if they are the first tutee on the group list (on the tutorial group allocation list and your attendance sheet) then they are to research the first topic; if the second on the list then the second topic; and so on. Your group may not cover all of the topics on the list. Some groups might have been allocated less than nine tutees and some of those allocated to you might already have withdrawn. Please try to say a few words about any topics not addressed by your tutees.

In this tutorial each tutee should come armed with some preliminary notes on their assigned topic. There is no need to collect these or give written feedback on them. Following the tutorial the tutees will be turning these notes into a 1000 word submission for **Coursework Submission A.**

Watch the clock - With nine tutees you can only spend six minutes on each one - and that is if you manage to start promptly!

The submission deadline for Coursework Submission A has been deliberately set to come before Tutorial 3. In Tutorial 3 your tutees will be asked to present half a dozen key points from their Coursework Submission A submissions for further discussion by the group. Make sure your tutees understand the importance of submitting their assignments by the due time.

Assigned Topics 1 - 9

Industrial Robots	- Types - Controllers	1st Tutee 2nd Tutee
Artificial Intelligence	- Sensing - Control	3rd Tutee 4th Tutee
User Interfaces	- Design - Evaluation	5th Tutee 6th Tutee
Safety Critical Systems	- Examples - Interlocks	7th Tutee 8th Tutee
Software Negligence	- Examples	9th Tutee

Guidance Notes on Assigned Topics 1 - 9

- **Industrial Robots** **Types** ***1st Tutee***

  Manipulator Arms - *Actuators (drives) - Electric, Hydraulic, Pneumatic*

  Typically 3 joints in the arm and up to 3 more in the wrist

  4 main "geometries" - *Cartesian (or Gantry)*

  Cylindrical

  Polar (or Spherical)

  Articulated (or Revolute)

  Automated Guided Vehicles (AGVs) - *Load-bearing vehicles or tractors towing trucks*

  Wire or painted line guided

  Dead-reckoning, reference beacons, inertial navigation, maps

  Tele-operation - *Remotely operated vehicles (ROVs) and arms*

- **Industrial Robots** **Controllers** ***2nd Tutee***

  3 main types -

  Limited Sequence controllers use mechanical stops - no computers involved

  Servo-controllers give point-to-point control but nothing in between

  Continuous Path controllers control arms between points as well

  4 main programming methods -

  Physical Set-Up (for Limited Sequence controllers)

  Walk-Through (drag arm through required steps)

  Lead-Through (remotely drive arm through required steps)

  Off-Line (permits absolute co-ordinates to be used)

- **Artificial Intelligence** **Sensing** ***3rd Tutee***

  Sensor Types *Tactile (touch)*

  Remote - *Photocells, etc.*

  Acoustic, sonar, etc.

  Visual, radar, etc.

  Various esoteric others ...

  Sensor Processing for *Proximity detection (touching things)*

  Range finding (distances)

  Speech recognition (this is a real AI task)

  Object recognition (this is a real AI task)

  Object Recognition achieved by *Pattern matching*

  Edge detection

  Texture and shading information

- **Artificial Intelligence** **Control** ***4th Tutee***

  Cybernetics, Feedback, Adaptive Control

  Control diagrams (E.g. closed feedback loops)

  "Smart" Feedback - *Requires sensors*

  Integrates data from different sensors

  Involves decision making (this is a real AI task)

  Decision Making - *Expert Systems*

  Fuzzy Logic

  Artificial Neural Networks

  Machine Learning

- **User Interfaces** **Design** ***5th Tutee***

  Shneiderman's 8 Golden Rules (Case of the Killer Robot - Article 6)

1. *Strive for consistency*
2. *Enable frequent users to use shortcuts*
3. *Offer informative feedback*
4. *Design dialogues to yield closure (user should know when it is ended)*
5. *Offer simple error handling*
6. *Permit easy reversal of actions*
7. *Support internal locus of control (user should feel in control)*
8. *Reduce short-term memory load (do not overload user)*

Metaphors (E.g. treating a computer screen like a desk-top)
Mental Models (Building models of users to help predict their needs)
Standards (E.g. for disabled persons)

- **User Interfaces** **Evaluation** ***6th Tutee***

User testing - *Observation, surveys, questionnaires*
Analysis (statistical)
Benchmarking (standard tests)

Prototyping - *Users try using incomplete systems*

Testing in real environments rather than under controlled lab conditions

- **Safety Critical Systems** **Examples** ***7th Tutee***

SCS are systems, the consequences of failure for which, carry a high human cost
Cost does not have to be life-threatening but frequently is
Examples include - *Health-care systems*
Dangerous machinery and transport systems
Essential supply systems

- **Safety Critical Systems** **Interlocks** ***8th Tutee***

Fail-safe systems - fail to safety (E.g. switch off by default)
Safest are hardware interlocks but software interlocks can be "smarter"
Hardware interlocks - *Physical switches on gates*
Pressure mats
Infra-red beams
Software interlocks - *Computer controlled*
Can use smarter sensors
"Permit-to-work" systems
"Fly-by-wire" avoids mechanical failures

- **Software Negligence Examples *9th Tutee***

  Therac 25 - Delivered overdoses of radiation therapy (poor user interface misled operators)

  ESA Ariane 501 rocket - Blown up (untested re-used software caused inertial reference system to crash)

  NASA Mars Climate Orbiter - Lost in space (mix-up over units of thrust - pounds force versus Newtons)

  Millennium Bug??

Topic 3

The Case of the Killer Robot

Assigned Topics 1 - 9

In this tutorial each tutee should come armed with up to half a dozen key points extracted from their previously submitted Coursework Submission A.

Ask each tutee to briefly present their key points to the group and ask the group to try to identify at least one good point and one bad point in each presentation. The purpose of this is simply to encourage the group to think about the presentations. In this tutorial you should not ask the group to actually report any bad points they identified. Neither are you expected to carry out a full post mortem in this tutorial.

With each tutee, firstly get, or help, them to write their key points up on the blackboard as bullet points. Then ask them to stand at the front and say a few words about each point and where they got their information. **Watch the time!** You can only allow about four minutes per speaker. When they have finished, ask the other tutees if they have any questions for the speaker. If none does then please try to dream up at least one question yourself.

For some of your tutees this will be the first time they have ever addressed an audience so be gentle with them. Praise speakers who do something particularly good in their presentation and explain to the others why it was praiseworthy.

Here are some examples of good things

• Introducing oneself	*An audience needs to know who the speaker actually is*
• Speaking clearly	*Essential to audience understanding*
• Good positioning	*Lets the audience see/hear all that they should*
• Smiling	*Gives a friendly impression*
• Cracking the odd joke	*Helps to create an informal atmosphere (can overdo it)*
• Looking at the audience	*Helps to make the audience feel that they matter*
• Using props	*Use of visual aids and objects increases interest*
• Using anecdotes	*Helps relate the presentation to real-world experiences*

- Inviting questions at the end *Encourages the audience to ask them*
- Asking questions during *Encourages audience participation*

Do not draw attention to bad things at this stage. All of your tutees will learn something from simply witnessing things that were bad or did not work. **There is no need to say anything that detracts from a tutee's confidence.**

Do get each tutee to attempt a presentation. Start with the most confident tutees so that their experience can be used to encourage the less confident. Be ready for problems with the less confident tutees when their turns come.

Some problems you might have to handle include:

If a tutee dries up try feeding them a word or a line.

If a tutee starts stammering try turning the presentation into a conversation between them and you by asking questions to help them along.

If a tutee breaks down (or looks like they are on the verge of doing so) step in immediately. Explain that it can be very stressful making presentations if you are not used to it and suggest that they resume their seat. Try to keep talking until they get back to it so as to keep the focus of attention away from them. Then tell the tutee you will go through their points with them at the end. When the time comes do this in a simple one-to-one conversation with both of you seated.

Reminder of Assigned Topics 1 - 9

Industrial Robots	Types	1st Tutee
	Controllers	2nd Tutee
Artificial Intelligence	Sensing	3rd Tutee
	Control	4th Tutee
User Interfaces	Design	5th Tutee
	Evaluation	6th Tutee
Safety Critical Systems	Examples	7th Tutee
	Interlocks	8th Tutee
Software Negligence	Examples	9th Tutee

Topic 4

Analysis and Specification

Each of your tutees has been assigned a *different* topic from the list below. They have been told that if they are the first tutee on the group list (on the notice boards and on your attendance sheet) then they are to research the first topic; if the second on the list then the second topic; and so on. Your group will not cover all of the topics on the list. Some groups will have been allocated less than nine tutees. Please try to say a few words about any topics not addressed by your tutees.

In this tutorial each tutee should come armed with some preliminary notes on their assigned topic. There is no need to collect these or give written feedback on them. Following the tutorial the tutees will be turning these notes into a 1000 word submission for **Coursework Submission B**.

Ask each tutee to briefly summarise what they have discovered so far and encourage the others to help by suggesting additions/omissions/corrections. Use the notes overleaf to help you and your group guide each tutee towards the ideas which the markers will be expecting. Remind them of the importance of organising their final submissions carefully and stating their sources.

Watch the clock - With nine tutees you can only spend six minutes on each one - and that is if you manage to start promptly!

The submission deadline for Coursework Submission B has been deliberately set to come before Tutorial 5. In Tutorial 5 your tutees will be asked to present half a dozen key points from their Coursework Submission B submissions for further discussion by the group. Make sure your tutees understand the importance of submitting their assignments by the due time.

Assigned Topics 10 - 18

Structured Systems Analysis & Design Method (SSADM)	1st Tutee
Dynamic Systems Development Method (DSDM)	2nd Tutee
Waterfall Model of Software Development	3rd Tutee
Unified Process Model of Software Development	4th Tutee
Rapid Prototyping	5th Tutee
Extreme Programming (XP)	6th Tutee
Reusable Software	7th Tutee
Open Source	8th Tutee
PRINCE Project Management Method	9th Tutee

Guidance Notes on Assigned Topics 10 -18

Structured Systems Analysis & Design Method (SSADM) 1st Tutee

SSADM revolves around the use of three key techniques, namely

- Logical Data Modelling
- Data Flow Modelling
- Entity/Event Modelling

The success of SSADM may lie in the fact that it does not rely on a single technique. Each of the three system models provides a different viewpoint of the same system, each of which are required to form a complete model of the system. Within SSADM each of the three techniques are cross-referenced against each other to ensure the completeness and accuracy of the complete model.

Dynamic Systems Development Method (DSDM) 2nd Tutee

A RAD (Rapid Application Development) approach which began to be adopted in the late 80's. They are based on a number of fundamental premises, the most important being the acceptance that business processing requirements will inevitably change during the development cycle of a system.

In order to work with this fact of systems development life the RAD approach mandates :

- Use of 4th Generation Tools (to enable quick delivery)
- Iterative model of systems development which allows backtracking in the light of changing requirements
- Use of evolutionary prototypes (SSADM adopts the adage that a picture is worth a thousand words, RAD goes a step further and advocates that a working model is worth a thousand pictures)
- Very high level of user involvement in the development process to aid in communications and to encourage feelings of commitment and ownership
- Empowerment of highly skilled, multi-disciplinary teams consisting of users, analysts and technical specialists

The RAD approach has been used successfully in many organisations and is currently gaining more formal support with the advent of DSDM

.

Waterfall Model of Software Development 3rd Tutee

The classic model of software development. It considers the process as progressing through a series of stages from requirements analysis through specification, design, coding, testing to documentation and maintenance. Each stage was completed before the next was started. The absence of any significant iteration between the different stages was the main problem with the classic model.

- Requirements Analysis & Definition
- System & Software Design
- Implementation & Unit Testing
- Integration & System Testing
- Operation & Maintenance Feedback loops were added between stages.

Feedback is limited to successive stages in order to minimise expensive re-work involved in feedback across many stages. Rudimentary prototyping is possible through "build it twice" steps running in parallel with requirements analysis and design. It is consistent with the top-down structured programming approach. It does not accommodate rapid prototyping (4th generation languages).

Unified Process Model of Software Development 4th Tutee

A model which subsumes ideas from the "Three Amigos" of Object Orientation (Booch, Rumbaugh and Jacobson). It is based on the iterative nature of a typical development.

The Unified Process identifies 4 key phases (each of which may be iterative in itself):

- Inception Covers the business case for and scope of the project and ends with a commitment from the customer to proceed
- Elaboration Builds the basic architecture, plans the construction and identifies significant risks
- Construction Produces the beta-release version of the system
- Transition Introduces the system to the users

Rapid Prototyping 5th Tutee

Broadly there are two types of prototyping: paper-based and computer-based. Paper-based involves paper sketches, storyboards, and scripts. Computer-based can use formal prototyping tools or graphical toolkits such as Tcl/Tk or HyperCard, or multimedia packages such as Director.

Prototypes do not have to have all the underlying functionality. Instead they are dynamic simulations, where the user can try-out the interaction with the system to assess its usability. The prototypes therefore must be sufficient to get over the style of interaction,

the sequence of screen-shots, effectively the 'look and feel', but do not have to be fully implemented, 'good' graphic, working systems.

The purpose of prototyping is to provide a model of the system that the user can 'play' about with very early in the development work and which does not require too much time, effort, and cost - called rapid prototyping. One can then use a number of evaluation techniques and criteria to more formally assess the success of the prototypes before starting implementation or continuing with re-design iterations.

Extreme Programming (XP) 6th Tutee

One of a growing number of so-called "lightweight" methodologies which aims to produce simple and elegant software rather than complex and hard to maintain. The iterative nature of the development process is acknowledged in the feedback loops which are written into each stage of the process.

Key stages in XP include

- Release Plan
- Iteration Plan
- Acceptance Test
- Stand Up Meeting
- Pair Negotiation
- Unit Test
- Pair Programming
- Code

Some key concepts in XP are - User Stories Collective Code Ownership Pair Programming Refactoring Continuous Integration

Reusable Software 7th Tutee

As it says. Reusing software offers huge economic advantages but carries a potential for disastrous outcomes. Ariane 5 reused Ariane 4 software inappropriately and had to be destroyed in flight.

Reusability can be found/employed at many levels

- Algorithmic - simply reusing previously written algorithms
- Function/Procedure/Method - calling up library routines
- Class/Object - huge resources appearing now on the WWW
- Tools - linking through DLLs/APIs to other existing programs

Open Source 8th Tutee

Making source code available with a software product.

Supported by Free Software Foundation (GNU) responsible for Linux, the Open Source Initiative (OSI) and the publisher O'Reilly.

"The Cathedral and the Bazaar" - a book making the case for Open Source by Eric Raymond (and now published by O'Reilly) can be found on the web at North Carolina State University.

PRINCE Project Management Method 9th Tutee

PRojects IN Controlled Environments

A structured method for project management that provides guidance as well as formal procedures. Developed in 1989 by CCTA, it was adopted as the standard for all UK Government information system projects. It became a de facto standard used in the private sector, both in the UK and internationally. The PRINCE method is in the public domain, but the title PRINCE is a registered trademark of CCTA (the Central Computer and Telecommunications Agency). PRINCE is compatible with the ISO9001 standard for quality management systems. *PRINCE II developed PRINCE further to make it more usable.*

PRINCE defines three components

- Organisation Defines who is responsible for the various tasks
- Plans Defines intentions for the performance of activities, the use of resources, quality levels and check, handling of exceptions
- Controls Management controls (meetings, progress reports etc) Product controls (Quality Reviews etc)

Topic 5

Design and Development

Assigned Topics 10 - 18

In this tutorial each tutee should come armed with up to half a dozen key points extracted from their previously submitted Coursework Submission B.

Ask each tutee to briefly present their key points to the group and ask each member of the audience to complete an anonymous review form on each presentation. Fill out a review form for each tutee yourself as well.

With each tutee, firstly get them to write their key points up on the blackboard as bullet points. Then ask them to stand at the front and say a few words about each point and where they got their information. **Watch the time!** You can only allow about four minutes per speaker. When they have finished, ask the other tutees if they have any questions for the speaker. If none does then please try to dream up at least one question yourself.

At the end of the tutorial collect all of the review forms and pass them to the speakers for feedback.

For some of your tutees this will be only the second time they have ever addressed an audience so continue to be gentle with them. Praise speakers who do something particularly good in their presentation and explain to the others why it was praiseworthy.

Here is a reminder of some good things to look out for :

Introducing oneself	*An audience needs to know who the speaker actually is*
Speaking clearly	*Essential to audience understanding*
Good positioning	*Lets the audience see/hear all that they should*
Smiling	*Gives a friendly impression*
Cracking the odd joke	*Helps to create an informal atmosphere (can overdo it)*
Looking at the audience	*Helps to make the audience feel that they matter*
Using props	*Use of visual aids and objects increases interest*
Using anecdotes	*Helps relate the presentation to real-world experiences*
Inviting questions at the end	*Encourages the audience to ask them*
Asking questions during	*Encourages audience participation*

Do get each tutee to attempt a presentation. Start with the most confident tutees so that their experience can be used to encourage the less confident. Be ready for problems with the less confident tutees when their turns come.

Here is a reminder of some of the problems you might have to handle.

If a tutee dries up try feeding them a word or a line. If a tutee starts stammering try turning the presentation into a conversation between them and you by asking questions to help them along.

If a tutee breaks down (or looks like they are on the verge of doing so) step in immediately. Explain that it can be very stressful making presentations if you are not used to it and suggest that they resume their seat. Try to keep talking until they get back to it so as to keep the focus of attention away from them. Then tell the tutee you will go through their points with them at the end. When the time comes do this in a simple one-to-one conversation with both of you seated.

Reminder of Assigned Topics 10-18

Structured Systems Analysis & Design Method (SSADM)	1st Tutee
Dynamic Systems Development Methodology (DSDM)	2nd Tutee
Waterfall Model of Software Development	3rd Tutee
Unified Process Model of Software Development	4th Tutee
Rapid Prototyping	5th Tutee
Extreme Programming (XP)	6th Tutee
Reusable Software	7th Tutee
Open Source	8th Tutee
PRINCE Project Management Method	9th Tutee

Topic 6

Testing and Usability

Assigned Topics 19-27

In this tutorial each tutee should come armed with a prepared presentation on their Coursework Submission C topic. They have been told to prepare a talk of about twice the length of their previous presentations. Please ask four of them to present at this tutorial. The remaining five should present at Tutorial 7.

Ask each speaker to briefly present their talk to the group and ask each member of the audience to complete an anonymous review form on each presentation. Fill out a review form for each tutee yourself and **assign a mark out of 10** as well. The marks will be normalised between tutors before assigning a final mark to each student.

Once again you will need to **watch the time**! You can only allow about seven or eight minutes per speaker. When they have finished, ask the other tutees if they have any questions for the speaker. If none does then please try to dream up at least one question yourself.

At the end of the tutorial collect all of the tutees' review forms and pass them to the speakers for feedback.

Here, again, is a reminder of some good things to look out for

Introducing oneself	An audience needs to know who the speaker actually is
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Asking questions during	Encourages audience participation

Assigned Topics 19-27

Napier's Bones	1st Tutee
Pascaline	2nd Tutee
Multiplier Wheel	3rd Tutee
Difference & Analytical Engines	4th Tutee
Tabulating Machine	5th Tutee
Z1-Z4	6th Tutee
Colossus	7th Tutee
ENIAC/EDVAC	8th Tutee
EDSAC	9th Tutee

1. Napier's Bones 1614 Logarithms John Napier, Scotland
   http://www.cee.hw.ac.uk/~greg/calculators/napier/index.html
2. Pascaline 1642 Addition Blaise Pascal, France
   http://www.cee.hw.ac.uk/~greg/calculators/pascal/Pascaline_Frames.htm
3. Multiplier Wheel or Stepped Drum 1672-94 Multiplication Gottfried Leibniz, Germany
   http://www.cee.hw.ac.uk/~greg/calculators/stepped/project_html/contents/intro.html
4. Difference & Analytical Engines 1820-71 Tabulation Charles Babbage, UK
   http://www.sciencemuseum.org.uk/collections/exhiblets//babbage/start.asp
5. Tabulating Machine 1884-90 Census counting Herman Hollerith, USA
   http://www.eingang.org/Lecture/hollerith.html
6. Z1-Z4 1934-45 General Purpose Konrad Zuse, Germany
   http://ei.cs.vt.edu/~history/Zuse.html
7. Colossus 1943 Decryption Bletchley Park, UK
   http://www.codesandciphers.org.uk/
8. ENIAC/EDVAC 1946-52 General Purpose Pennsylvania University, USA
   http://www.seas.upenn.edu/~museum/
9. EDSAC 1949 General Purpose Cambridge University, UK
   http://www.dcs.warwick.ac.uk/~edsac

Topic 7

Ethics and Culpability

Assigned Topics 19-27

In this tutorial each tutee should come armed with a prepared presentation on their Coursework Submission C topic. They have been told to prepare a talk of about twice the length of their previous presentations. Please ask four of them to present at this tutorial. The remaining five should present at Tutorial 7.

Ask each speaker to briefly present their talk to the group and ask each member of the audience to complete an anonymous review form on each presentation. Fill out a review form for each tutee yourself and **assign a mark out of 10** as well. The marks will be normalised between tutors before assigning a final mark to each student.

Once again you will need to **watch the time**! You can only allow about seven or eight minutes per speaker. When they have finished, ask the other tutees if they have any questions for the speaker. If none does then please try to dream up at least one question yourself.

At the end of the tutorial collect all of the tutees' review forms and pass them to the speakers for feedback.

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Assigned Topics 19-27

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Pascaline	2nd Tutee
Multiplier Wheel	3rd Tutee
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