Teaching Over-Performing Students – TOPS

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First year programming ...
... is problematic
- some students can
- some students can’t
... what do we do
- try to motivate them all?
- teach to the middle?
- provide extra support for the strugglers?
... what about our best programmers?

TOP students
We all have top students
- obviously find the work easy
- programmed before
- pick it up quickly
- find lectures too simple and slow
- get bored with mundane exercises

We all have strategies to cope with our students
- Ours include:
  - CSCS
  - Rocket scientists
  - If you have some to share let us know
  - 1 day TOPS event

The project
Teaching Over Performing Students

The project was designed to incorporate ...
- sharing of current practice
- peer observations across universities
- collaborative problem setting
- intra-university programming competition
... as a means of extending the most able students in programming courses

Peer observation
Share current practice
Obtain a ‘sense of place’
- Meet academics to find out:
  - what they do
  - more about their students
  - the problems they encounter
  - how they want to stretch their students

Existing competitions
The IBM student competition
  http://developer.ibm.com/university/students/contests/
The international Imagine Cup
  http://imaginecup.com/
The ACM student research competition
  sponsored by Microsoft
  http://www.acm.org/srcc/
BCS competition
  http://www.bcs.org/
Topcoder collegiate challenge
  http://www.topcoder.com/

Good points
  - Motivate good students
  - Are only for the best
  - Look good on the CV
Bad points
  - Not linked to the curriculum
  - Students don’t always want extra learning
  - International competitions lean towards US-centric

Competition ...

The project

Existing competitions

The project
Our competition

Based upon our curricula
- Using only what we expect our students to know
- Set in collaboration challenge
- Be more immediate and relevant
Look good on the CV
Motivate our top students

Our challenges

How many students?
- Determined by funding and rail fares
What will the students do?
- Write code
- Present that work
- Must fit all 4 syllabuses
- Must be interesting/relevant
When will it happen?
Sponsorship?
- Venue
- Prizes

Our challenges - sponsorship

Sun Microsystems provided
- Venue
- Catering
- Some prizes
This fixed a date for the competition
- 14th March 2007

Our challenges – what will the students do

Scenario
- Something relevant to a group of students attending a tech conference in London
Setting a challenge task
- Students to set tasks
  - Manageable in 1 hour by 2 students pair-programming
  - Must fit all 4 syllabuses
  - Motivating
- Prize for best challenge
  - Motivating
  - Challenges more likely to be suitable

Involving the students ...

Choose the team

Each institution chose its team in whatever way was appropriate to them
- Team size
  - 8 students
  - 6 students going to London
  - Some students participated who otherwise couldn’t
- Back up in case anybody dropped out

How we did it ...

Kent

Leeds
The day itself

- The students' first taste of such an event
- Most students attended James Gosling's keynote
- They had the opportunity to attend talks and browse stalls
- All properly registered with delegate badges
- Competition was not hidden
- On the programme
- On direction boards
- Proper sign on the door
- Assigned to a conference staff helper
- Sun allowed us to use their logo on certificates

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Team</th>
<th>Challenge</th>
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</thead>
<tbody>
<tr>
<td>1030</td>
<td>Introduction</td>
<td>Soton</td>
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<tr>
<td>1045</td>
<td>Challenge 1</td>
<td>Leeds</td>
<td>2</td>
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<tr>
<td>1200</td>
<td>Challenge 2</td>
<td>Kent</td>
<td>3</td>
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<tr>
<td>1300</td>
<td>Lunch</td>
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<tr>
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<td>Challenge 3</td>
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<tr>
<td>1500</td>
<td>Judging</td>
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<td></td>
</tr>
<tr>
<td>1600</td>
<td>Prize giving</td>
<td></td>
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</tbody>
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Student feedback

Working together was great. Everyone worked amazingly well in teams.
I liked that we were supposed to work at our natural pace and that we had to think.
Making the challenge idea was easy, but the wording and the mark scheme wasn’t.
It was really intense, but great fun.
It’s great – thank you for organizing it.
We’ve got a proper sign on the door like all the other rooms.

We intend to run this again

- The students enjoyed it
- The students learned from it

Next year

- Probably teams of 5
- With 4 students going to London

Does anybody want to join us?