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POSTGRADUATE CERTIFICATE IN TEACHING IN HIGHER EDUCATION

Cylch Dygu 1 | Teaching Cycle 1

Use of Student Participation to Illustrate Sorting Techniques

Mae’r Cylch Dygu hwn o’r portffolio TUAAU wedi’i gyflwyno i CADAIR gyda chaniatâd yr awdur uchod. Adnodd i’w ddefnyddio gan ymgeiswyr y TUAAU yn y dyfodol a staff eraill ydyw, fel rhan o’u datblygu proffesiynol ym Mhrifysgol Aberystwyth. Erys yn eiello i’r awdur a Phrifysgol Aberystwyth. Os hoffech dyfynnu’r gwaith hwn neu gyfeirio ato, cysylltwch â’r awdur. Ceir y manylion cyswllt yn http://www.aber.ac.uk/cy/directory/.

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3.2 Report: Use of student participation to illustrate sorting techniques

3.2.1 Introduction

Sorting can be a very tedious subject to learn and teach by traditional methods. With a little imagination, however, the different methods of sorting can be illustrated with some very inexpensive visual aids and a little imagination.

3.2.2 Plan to improve teaching

I planned to use cards with numbers on them, together with a number of students to illustrate a number of different sorting styles. I shall get the students to demonstrate a simple bubble sort, as that is the style of sort which they would instinctively come up with. I shall then demonstrate selection sort, that is similar to bubble sort, almost as easy to implement, but requires fewer swaps. I will demonstrate these by having each student have a numbered card, and one student to run the algorithm and instruct the numbers when and where to swap. I might also use the technique to illustrate another simple sort, depending on the level of enthusiasm of the students.

I shall use 11 students to illustrate Radix sort, this can be illustrated using 10 students to represent bins or hoppers, and one more student to run the algorithm. The cards will be put in each of the hoppers depending on the digit being sorted, the cards will then be collected, and the process will be repeated for each subsequent digit.

3.2.3 Progress Notes

During the work in class, there was some initial reluctance to participate, but when I involved a group of 10 or more students, they appeared to take some strength from safety in numbers. In one instance, I specifically targeted a student to run the algorithm to be one of those more able students that occasionally have attention difficulties in lectures, and managed to engage this particular student who often is a problem to such an extent that he sent me an email following the lecture with some code that he had written implementing one of the sorting algorithms.

3.2.4 Feedback

Students appeared to enjoy the interactive nature of the lecture after the initial reluctance to take part. As I mentioned in the progress notes, one student, completely unbidded sent me some code that he had written “for fun” the evening after the lecture.

Looking at the examination results, more students appeared to understand the simple sorts better, but on the Radix Sort, there was still a lack of understanding about the complexity of the sort, although those that did identify that they should be describing the Radix Sort managed to describe it well.
3.2.5 Implications

I feel that this method for presenting sorting techniques is both valid and useful, and I will be using it again in future years. I will be placing more emphasis on the complexity analysis of how the algorithms behave to try to re-enforce that part of the course, as well as the simple presentation of the algorithms.

3.2.6 Personal comments

When involving groups of students it may be initially helpful to ask for volunteers, but certainly in Computer Science, it is usually quicker to just nominate students.

The aim of the task is to get the whole of the class participating with the student running the algorithm.

The Radix sort could be set up to be even more hands-off by the teacher, and could involve another student writing up an algorithm on the board, as the rest of the class work out a way of sorting given the setup of bins and some explanation of the overall type of system.