So thanks very much.

Actually I’m so happy to have this venue to discuss problems which has been used for the first year engineering students in the class of computing and the programming.

For the computers we know now in all the areas in our daily life in science, in engineering, we all use the computers. And also for the school we also have a program that restructure in 2009. So we start to offer the common first year course for all engineering students and then at that time we start to introduce these course to both campuses.

And also we found out the students are very good in all the electronics device or the tools, but is also very dangerous. If we didn’t teach them how to use those tools correctly and then we will get something like the garbage in and also we have the garbage out. So that’s the things we start looking at.

And apart from that also we have to looking at the class we are facing to a first year engineering students on the Gold Coast campus. This year we have over 300 students, and also other presenters. Also the diversity of the students background from their life experience and also from their knowledge as well. So very, very different. Some of them have very good understanding about the science about the mathematics, and also about the problems itself. But some of them have very limited understanding or some of them they haven’t had any physics class in high school, so all those are very challenging for us when we develop the curriculum and also the contents.

Another challenge is for us because it’s a common first year for all engineering, so we have civil engineering, mechanical engineering, as we offer this year, and electronics and the electrical and as well as engineering. So all different engineering disciplines. Of course for engineering in the fundamental we have the same knowledge or theories. But up to we go to, once more specific area then we will have different focus. So when we designed the curriculum we also take into account all of this.

Then we think “Okay, what’s the best approach I should adopt to deliver the whole content, the whole course, or the product, to the students?”. And from the employer’s point of view, and also from Engineer Australia accreditation requirement. So we know engineers, they are finding the solutions for the engineering problems, or they are problem solver. So I use for this actually is a traditional and also I think managing about
that, the most obvious technique maybe that the best or the most appropriate method. So I use this problem solving method to introduce the whole course.

From the theory part of course we use the traditional lecture delivery method, but when we deliver those lectures we select the examples from the single example and then build up. And scaffolding to more complex problems. And then we have the venue to introduce a student with syntax, the algorithm and how to use that algorithm to solve their problems. And then we have a three hours lab activity after our lectures and that’s the time the students try to use the knowledge that they have learned in the lecture time to solve those problems we have provided to them. And eventually they build up their techniques or skills to solve more complicated problems. And at the end, actually the student can solve some, because you remember they are first year students, they don’t have that advanced engineering knowledge, so we solve some simple, we set up some simple problems for them to solve.

For example for this semester at the end of this semester the student has been asked to solve a problem or design problems solutions that to try to find out the optimal operation method. Because a lot of students they have seen or they have experienced last year’s flooding and due to the Wivenhoe Dam operation, you still have some engineering arguments. But then we start from that problems they know or they are familiar with, and try to use the computing programming to solve that problem. So we follow that procedure exactly. First they identify the problem and then they formulate the problem. Actually they found that’s the most challenging part, to formulate the problem. Because we have the problem here, how can we translate that to a mathematic language? So there are some governing laws. I also get them to experience how we go into that procedure and then to find out what’s the best algorithm or what’s the best operation route to a dam, to operate the dam.

And then of course you have to test your solutions. Because some students they find some solutions because they use the wrong unit. For example litre, some using a cubic metre, then they get totally different solutions. They got the very, very high velocities, that’s not realistic. So we have to let them realise for engineer that’s important. Number mean nothing. We have to go with the unit together. That will be checking your solutions.

So that’s the way we deliver the engineering computing and the programming course. So from this course I found out actually the most challenging part is the problem formulation and also through this course I always choose all different type of the engineering examples to cover all different discipline, and then to stimulate the students’ interest. Because I always talk to those students and some of them not very such “Which discipline I should go with”. So through those example actually I also give them some ideas or motivations “Which direction I should follow in my career”. And also I always talk to those students after this course, course, and for the advanced, sorry, in the second year, third year some of them continue to use this for their other course study to have some data analysis, for some design, for some project, or for some report. So it’s
very useful. And also even this year I talk to some students doing the IAP project. So they effectively use this for their IAP project.

And of course then for their future career this is a definitely useful tool for design, for planning, for management, for all the engineering disciplines.

So that’s’ all for me. Thank you.

[Applause]