

Pīkahu Name: Communicating well when programming (CT P0 5)

Video Name: There's more than one way to do it (EMP10-5)

Presenters: Tim Bell and Joanne Roberts

Tim: One of the things about programming is that there is no single way to write a program. There can be many different programs that do exactly the same thing.

Joanne: Probably as many different programs as there are students.

Tim: Exactly. In fact you would expect every student to produce a different program. There's so many things to choose like what's the name of your variables to start with. Also there are different structures, different ways of achieving the same thing.

Joanne: So if they are looking quite similar it would be 'er, who's cheating?'

Tim: Or who's helping each other?

Joanne: Supporting, yes.

Tim: In fact a really good technique for learning programming is Pair Programming.

Joanne: Yes.

Tim: As long as it is deliberate.

Joanne: Yes.

Tim: Not so much in an exam perhaps. I'm going to write a program that counts down from 10. Maybe you've got a rocket that you are about to launch or something and you need to count it down. To write this program what I've done here is called a Parsons Problem. Parsons is an author who came up with this idea for teaching programming where you give students all of the code that they need to write the program but they have to put it back together.

Joanne: My students have found that quite useful. It helped them to really get stuff correct sooner rather than later.

Tim: Right. It removes half of the things they have to think about but they are still having to think about the structure of the program. I've mainly done it because it's going to be a bit quicker for us but it is another pedagogical tool for teaching programming. So what we want to do is... the first thing is 'set the count to 10'. I've got this variable that's going to count down for us. Then 10 times we are going to say what the number is and then subtract one from it. I'll try out my program. There we go, we are counting out 9, 8, 7, 6, 5, 4, 3, 2, 1 hopefully. At the end of it we could have blast off, we could have an output that triggers a rocket of something like that and all sorts of stuff. What I wanted mainly to do is say there are other ways of doing the same thing. I'm going to do it using a controlled loop that will repeat until the count gets to zero. So it actually starts off quite similarly. In fact I think I'll use some of this part of the program here. I'll just duplicate this to give me some of the ingredients for it. We're still going to start with a 'count of 10'. Inside the loop we are still going to 'say' it and we will subtract one from it *but* we are going to 'repeat until' the condition is met for not repeating which is that our count has got down to zero. So we'll just say 'until the count = 0' (there's my count variable there). We'll try running the program now. The cat's counting '10, 9, 8' and so on.

So these two programs they've got some things in common. They look a little different. Of course if it had been two different students the variable names might have been different as well. I've used the 'repeat' loop in different ways, or different kinds of repeat loops. Of course that raises the question, what's the best way to do it?

There's a few different criteria you might use. One of them might be which one's the easiest one to understand? If it's really cryptic and it does the same thing [as a less cryptic program] then it's going to be hard for the next programmer.

Joanne: Thinking about that next programmer.

Tim: Another question might be which is the fastest? Some things might run slowly. These ones both will take the same amount of time really so that doesn't come into it here. The other thing is how versatile is the program? If instead of counting down from 10 what's another number you might want to count down from?

Joanne: 23 days until Christmas?

Tim: Okay. We'll countdown 23 days until Christmas. So this one we'd have to change the program: set the count to 23 and I have to remember to repeat that 23 times so I've got to change those two values. In actual fact I probably should get an input from somewhere. Maybe look up what the date is, subtract that from 25 and count it down and so on. I've had to make two changes.

This one here if I set the countdown to start at 23...

Joanne: Nothing more needs changing does it?

Tim: That's right. So that one's a little safer. One change somewhere is less likely to cause problems somewhere else. So let's start counting down to Christmas. Wouldn't it be cool if each day was only one second? It would be Christmas already.

Joanne: Have you done your shopping already?

Tim: I haven't actually. In fact now I'm panicking because that's way to fast. So these are just two different ways of doing that particular thing. There's always many ways of doing it. Some of them will look similar to each other. The main thing is to be aware that students may set off in quite different directions and both end up with a correct solution.

Joanne: Finished your shopping now?

Tim: Argh!