

Submission deadline and procedure: refer to Blackboard.

Introduction

This is the first (of two) assessed exercise for 6CM504. For each of these modules, this exercise is worth a total of 50% of the module.

Your submission for this exercise should consist of your source CSP script (bankers_username.csp) and any accompanying documentation (such as the short report). Submission should be via the “Assessment 1” portal on Blackboard. The deadline for submission is given on Blackboard. You will have approximately two weeks to complete this assignment (including two lab sessions) – it is not expected that the lab sessions alone will allow enough time to develop your solution.

This is an individual exercise. The University of Derby operates strict rules regarding academic offences and these will be enforced where necessary. You are not permitted to use generative AI for this exercise – indeed it will be counter productive to do so.

Background

In this lab exercise you will construct some simple models of your own – firstly as a paper exercise, and then in FDR.

Task 1

Writing our first CSP models, as a paper exercise!

Understanding bankers

Banks are, generally speaking, quite mysterious and untrustworthy entities – no-one really knows what they do. To this end, it would be very useful to have a model of a bank account that captures exactly what you can do with it!

A current account has a balance available. It may have nothing in it (a balance of zero) or it may have a positive balance. The owner of a bank account may deposit any sum of money in it at any time, they may withdraw any sum up to their available balance, or they may simply query the available balance. Write (on paper – we will visit the tools later!) a model of a simple bank account.

Now that we have a simple model of a bank account, we realise that the world is never that simple. Two things have become apparent. Firstly, in an effort to combat fraud when a bank sees an unusually large deposit into a bank account, it may (or may not!) delay making those funds available to the owner until such time that it is happy that they are not fraudulent funds. Once the bank has investigated the funds, it clears them in the account and makes them available to the owner. Secondly, our bank is not very reliable and has some security issues. Occasionally the security of a given account is compromised, and an unauthorised user manages to withdraw funds, as a seemingly perfectly normal transaction, without the owner of the account knowing or the bank realising that it is not the owner performing the transaction. Augment your model of a bank account to include these two features.

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In constructing your models, you should consider what activities (events) the customer and the bank engage in, when they engage in these events, and whether or not the customer (or indeed the bank!) is fully in control of these events happening.

Task 2

Put simply: implement your solution (or amended solution, if you feel you can improve it!) in FDR!

You should ensure that your implementation in FDR can be simulated and investigated in Probe.

Things to consider are:

- How accurately have you captured the informal description of a bank account given above?
- Is your solution over simplified, or over complicated?
- Does it model what you really would expect, or are there inadequacies in the informal description?
- Can we simulate it using the Probe feature, and does this simulation behave as expected?

You should write a short report (as a separate word document rather than included in the FDR script) explaining how your model is expected to work, features you have included, and some consideration of the points above. As this is our first exposition to the toolset, it might be that things do not simulate or behave exactly as you expect! If this is the case, you should explain what you were hoping to see, what you actually see, and why you think the two may be different!