COMP4075/G54RFP Coursework Part II

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1 Task II.1 — Dining Philosophers

- Explain Design and Implementation
- Sample output
- Discuss STM in relation to Resource Hierarchy Solution and arbitrator solution on wikipedia

1.1 Solution Design

The problem is to develop a system simulating a number of philosophers at a table all alternating between thinking and eating. The issue is the limited amount of eating implements (sporks were used in this solution as to distinguish from forking threads) and the fact each philosopher needs 2 sporks to eat.

The main idea behind the solution is the use of Software Transactional Memory (STM), where each spork is held in a piece of STM. If a philosopher is hungry they will wait until they can grab both sporks at the same time and then begin eating. After they have finished eating they return the sporks to the table (adding them back into the relevant STM) so others can get them if required.

1.2 Sample Output

Here is some sample output for my solution running with 7 philosophers around the table. It shows the first 50 lines of output and the time of each line being printed.

```
14:16:42 | Socrates is thinking
14:16:42 | Delaying Socrates 6 seconds
14:16:42 | Kant is thinking
14:16:42 | Delaying Kant 2 seconds
14:16:42 | Aristotle is thinking
14:16:42 | Delaying Aristotle 6 seconds
14:16:42 | Descartes is thinking
14:16:42 | Delaying Descartes 2 seconds
14:16:42 | Plato is thinking
14:16:42 | Delaying Plato 4 seconds
14:16:42 | Aquinas is thinking
14:16:42 | Delaying Aquinas 6 seconds
14:16:42 | Marx is thinking
14:16:42 | Delaying Marx 7 seconds
14:16:44 | Kant is hungry
14:16:44 | Kant is eating
14:16:44 | Delaying Kant 5 seconds
14:16:44 | Descartes is hungry
14:16:44 | Descartes is eating
14:16:44 | Delaying Descartes 5 seconds
14:16:46 | Plato is hungry
14:16:48 | Aristotle is hungry
14:16:48 | Socrates is hungry
14:16:48 | Aquinas is hungry
14:16:48 | Aquinas is eating
14:16:48 | Delaying Aquinas 8 seconds
14:16:49 | Kant is thinking
14:16:49 | Delaying Kant 7 seconds
14:16:49 | Marx is hungry
14:16:49 | Descartes is thinking
14:16:49 | Delaying Descartes 5 seconds
14:16:49 | Socrates is eating
14:16:49 | Delaying Socrates 4 seconds
14:16:49 | Aristotle is eating
14:16:49 | Delaying Aristotle 6 seconds
14:16:53 | Socrates is thinking
14:16:53 | Delaying Socrates 3 seconds
14:16:54 | Descartes is hungry
14:16:55 | Descartes is eating
14:16:55 | Delaying Descartes 3 seconds
14:16:55 | Aristotle is thinking
14:16:55 | Delaying Aristotle 3 seconds
14:16:56 | Aquinas is thinking
14:16:56 | Delaying Aquinas 5 seconds
14:16:56 | Kant is hungry
14:16:56 | Kant is eating
14:16:56 | Delaying Kant 5 seconds
14:16:56 | Marx is eating
14:16:56 | Delaying Marx 2 seconds
14:16:56 | Socrates is hungry
```