UNIVERSITY COMPUTER SCIENCE • EXERCISE SHEET

12.4 Version control and teamwork

Name: _____ Class: _____ Date: _____ **Total: 24 marks**

KEY WORDS branching model • merge conflicts

Objective

Run the branching model, size commits, and resolve a conflict as a decision.

1 Key knowledge and worked examples

■ The model

Main always releasable; short feature branches; reviewed pull requests; commits linked to requirements ✓.

■ Worked example: bisect

12 runnable commits narrow a regression to one change in at most 4 checkouts ✓.

2 Practice

2.1 What does a commit dump (“week of work”) break? [3]

2.2 Where does a conflict resolution belong? [3]

2.3 The course PR size rule is roughly what? [3]

3 Exam-style questions

3.1 The repo has 16 runnable commits, all tests green at each.

State the bisect bound (number of checkouts) and justify with the logarithm. A regression appears; describe the bisect run until one commit is isolated (states of good/bad). State the two properties the history needs for bisect to work. [8]

3.2 Two branches collide on LOAN_LIMIT: feature A sets it to 6 for the pilot program; feature B extracts it to a config file (value 5) so librarians can tune it.

Resolve the collision as a decision. State the merge commit’s message content. Give the review contract for each PR before the merge. State the risk of resolving silently. [7]

Solutions

2.1

- Bisect – the history stops narrowing to one defensible change ✓.

2.2

- In the merge commit's message (and the diff itself) – the decision lives with the code ✓.

2.3

- Under about 200 changed lines per pull request ✓.

3.1

- Bound: $\lceil \log_2 16 \rceil = 4$ checkouts ✓.
- Run: mark the last known good and the first known bad; bisect checks the midpoint commit (runs its tests), narrows good/bad halves; 4 checkouts later exactly one commit is the first bad ✓.
- Properties: every commit is runnable (tests can execute at any point) and every commit keeps the suite green when it was made – dumps or broken middles defeat the narrowing ✓.

3.2

- Decision: adopt the pilot value 6 via B's config mechanism – the rule stays tunable and the pilot is a config entry, not a code fork ✓.
- Message: names the collision, the decision (6 through config), and the reviewers of the call ✓.
- Contract per PR: diff + tests + requirement link, under ~200 lines, review against the acceptance test ✓.
- Silent resolution risk: the decision is lost – the next reader sees one value with no record of why or who chose it ✓.