Grade 10 Computing

Unit 8 · A Project in a Team

ANSWER KEY · FOR TEACHERS

Full marks 26

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. problem statement
2. functional requirement
3. quality requirement
4. design document
5. interface
6. dependency
7. task board
8. lost update

Each carries 0.5 mark. **K · 4**

2 Label the diagram

1. Understand
2. Specify
3. Build in stages
4. Evaluate, present

Each carries 0.5 mark. **K · 2**

3 Multiple choice

i. **c.** A day's 120 deliveries can be entered in under 20 minutes. **U · 1**

It says how well (how fast) the product must work, measured with a clock. The other three are jobs the program does: functional requirements.

ii. **c.** The interface in the design document: the function's name, what it is given and what it gives back, in what units. **U · 1**

An agreed, written interface lets both work at once. She can test her slips with a few made-up totals of the agreed shape, and when his function is ready, the two fit. A copy of her own would drift away from his, and a remembered plan is how the Mars Climate Orbiter was lost.

iii. **b.** Doing: the team's meaning of done also needs the old tests passing, the change log written and a teammate's reading. **U · 1**

"Done" means what the team agreed it means, not what one person feels. A module that works but broke something else, or that nobody else has read, isn't finished yet.

iv. **c.** Have the program point out sudden drops, so that a person asks the farmer and decides. **A · 1**

A drop has many innocent causes, and an automatic punishment gives a farmer no chance to explain. Showing the drop to a person keeps the useful part (spotting a possible problem) without the harm. That is also the lesson of Robodebt.

v. **b.** 3 **A · 1**

Each run halves the versions still possible: 7 suspects (2 to 8), then at most 4, 2, 1. Three runs, as in binary search. Going back one version at a time could take up to 7.

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4 What kind of line is it?

ANSWER U · 3

i. F; ii. Q; iii. N; iv. Q; v. F; vi. N.

MARKING SCHEME

- ✓ i. F and v. F: jobs the app must do.
- ✓ ii. Q and iv. Q: how well (how fast, without help) and in what conditions (no internet).
- ✓ iii. N, a wish nobody can test as written, and vi. N, a design choice.

5 Find the bug

ANSWER A · 4

```
OUTPUT
12 5.0 135
7 5.0 270
```

ii. Farmer 12's. It should be 3.0 × 4.0 × 15 + 2.0 × 4.5 × 15 = 180 + 135 = Rs 315. Line 11 keeps only the **last** delivery's payment instead of adding it to the farmer's total, so a farmer with two deliveries is paid for one. Farmer 7, with one delivery, comes out right, which is why the change went unnoticed.

iii. `result[farmer] = [old[0] + liters, old[1] + payment(liters, fat)]`. Then it prints `12 5.0 315` and `7 5.0 270`.

MARKING SCHEME

- ✓ The output `12 5.0 135` and `7 5.0 270`.
- ✓ Farmer 12 should get Rs 315 (180 + 135).
- ✓ Line 11 replaces the payment with the latest delivery's instead of adding to the total.
- ✓ The corrected line adds `old[1] +` before `payment(liters, fat)`.

6 Rounding once, or every time?

ANSWER A · 3

One delivery: 2.3 × 3.7 × 15 = Rs 127.65.
Rounding each delivery: Rs 128 × 15 = **Rs 1,920.**
Adding the exact amounts: 127.65 × 15 = Rs 1,914.75, rounded once: **Rs 1,915.**
The two differ by Rs 5. R3 now asks for Kamala didi's way: round once, to the nearest rupee, after adding the exact amounts, so **Rs 1,915.**

MARKING SCHEME

- ✓ One delivery is worth Rs 127.65.
- ✓ Rounding each: 15 × 128 = Rs 1,920; rounding once: Rs 1,914.75 → Rs 1,915.
- ✓ R3 asks for rounding once, at the end: Rs 1,915.

7 Tasks that wait for each other

ANSWER A · 3

i. A in week 1; B in week 2; C, D and G in week 3; E in week 4; F in week 5. The earliest finish is the end of **week 5.**

ii. A → B → C → E → F.

iii. D (week 3 or 4, since F starts only in week 5) and G (week 3, 4 or 5: nothing waits for it).

MARKING SCHEME

- ✓ The end of week 5.
- ✓ The longest chain A → B → C → E → F.
- ✓ D and G can move; every task on the longest chain can't.

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8 Think

ANSWER HA · 2

Not necessarily. The tests check only the cases the team thought of: they show the bugs they find, not that none are left. The evaluation still shows R4 only partly met (a wrong but real farmer number gets through), the evidence that disputes have ended is one payday long, and nobody has tried a payday with a power cut or a broken laptop. “Finished” means every requirement is met with evidence, the limits are written down, and the user can carry on without the team.

MARKING SCHEME

- ✓ Tests show the bugs they find, not that there are none: passing them isn’t proof of being finished.
- ✓ What is still open: R4 only partly met, one payday is weak evidence, or the user can’t yet carry on without the team.

9 Activity: Scan the consequences

(not marked)

WHAT STUDENTS SHOULD FIND

Gains: teachers save the minutes of the roll call; parents could be told quickly when a child is absent. Possible harms: students’ faces, a kind of data that can’t be changed like a password, kept by a company, perhaps abroad; a student the camera doesn’t recognize (a new haircut, poor light, a face like the ones it saw less in training) marked absent and blamed; students watched all day. Ways to reduce harm in the spirit of the unit: a teacher checks the list and decides, never the camera alone; a student can see and correct their record; find out where the faces are stored and delete them when a student leaves; measure how often it is wrong, and for whom, before using it; keep the paper register as a fallback. Good groups also ask whether a simpler way (a quick roll call) is enough.

Marks by level	Knowledge	Understanding	Application	Higher ability	**Total**
Marks	6	6	12	2	**26**

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