Raport Javor – Test Driven Development (TDD)

Informata të përgjithshme

Emri: Getoar Krasniqi

Java: 3 (e tretë)

Data e dorëzimit: 23/11/2025

Emri i projektit: Quiz Application

1 Përmbledhje e javës

Në javën e tretë është implementuar feature 2, në kuadër të së cilës janë përfshirë shtimi i:

- Timer,
- Difficulty levels,
- Enhanced answer review, dhe
- Category for questions.

Në README.md file janë shtuar ndihmesat se si të përdoren të gjitha pjesët e feature 2. Janë përditësuar statuset në fillim të README në përputhje me progresin e bërë në kod.

Gjenerimi i index.html me përqindje të mbulueshmërisë 100%.

Krijimi i "v3.0 Feature 2 Red Phase": 12 testet e feature 2 të shkruara, të cilat kanë dështuar në mungesë të kodit të implementuar.

Krijimi i "v3.1 Feature 2 Green Phase": Implementimi i kodit në mënyrë që testet e feature 2 të kalojnë me sukses.

Krijimi i "v3.2 Refactoring": Refaktorimi i kodit.

Krijimi i branch-ave për secilën javë deri tani duke u bazuar në tag-at e krijuar paraprakisht.

2 Testet e zhvilluara

Nr	Përshkrimi i testit	Statusi (kalon/dështon)	Framework /
1	test_create_multiple_choice_question	kalon	pytest
2	test_check_correct_answer	kalon	pytest
3	test_question_requires_text	kalon	pytest
4	test_create_empty_quiz	kalon	pytest

5	test_add_question_to_quiz	kalon	pytest
6	test_cannot_add_duplicate_questions	kalon	pytest
7	test_get_question_by_index	kalon	pytest
8	test_submit_answer_and_track_score	kalon	pytest
9	test_perfect_score	kalon	pytest
10	test_passing_grade	kalon	pytest
11	test_result_summary	kalon	pytest
12	test_complete_quiz_flow	kalon	pytest
13	test_question_has_category	dështon -> (v3.0) kalon -> (v3.1)	pytest
14	test_quiz_can_get_questions_by_category	dështon -> (v3.0) kalon -> (v3.1)	pytest
15	test_quiz_get_score_by_category	dështon -> (v3.0) kalon -> (v3.1)	pytest
16	test_question_has_difficulty_level	dështon -> (v3.0) kalon -> (v3.1)	pytest
17	test_question_default_difficulty_is_medium	dështon -> (v3.0) kalon -> (v3.1)	pytest
18	test_filter_questions_by_difficulty	dështon -> (v3.0) kalon -> (v3.1)	pytest
19	test_get_incorrect_answers	dështon -> (v3.0) kalon -> (v3.1)	pytest
20	test_get_answer_details	dështon -> (v3.0) kalon -> (v3.1)	pytest
21	test_quiz_has_time_limit	dështon -> (v3.0) kalon -> (v3.1)	pytest
22	test_quiz_starts_timer_on_first_answer	dështon -> (v3.0) kalon -> (v3.1)	pytest
23	test_quiz_tracks_elapsed_time	dështon -> (v3.0) kalon -> (v3.1)	pytest

24	test_quiz_can_check_if_time_expired	dështon -> (v3.0) kalon -> (v3.1)	pytest

3 Implementimi i bërë pas testeve

Implemetimet e bëra pas testeve të feature 2:

Moduli question.py

```
from typing import List, Optional


class Question:
    """Represents a single quiz question with multiple choice options"""

    def __init__(
        self,
        text: str,
        options: List[str],
        correct_answer: str,
        difficulty: str = "medium",
        category: Optional[str] = None,
    ) -> None:
        if not text or text.strip() == "":
            raise ValueError("Question text cannot be empty")

        self.text = text
        self.options = options
        self.correct_answer = correct_answer
        self.difficulty = difficulty
        self.category = category

    def check_answer(self, answer: str) -> bool:
        """Check if the provided answer is correct"""
        return answer == self.correct_answer

    def __eq__(self, other: object) -> bool:
        """Check equality based on question text and options"""
        if not isinstance(other, Question):
            return False
        return (
            self.text == other.text
            and self.options == other.options
            and self.correct_answer == other.correct_answer
        )
```

```
    def __hash__(self) -> int:
        """Make Question hashable for use in sets"""
        return hash((self.text, tuple(self.options), self.correct_answer))
```

Moduli quiz.py

```
from typing import Dict, List, Optional
from src.question import Question
from src.result import QuizResult
import time


class Quiz:
    """Represents a quiz with multiple questions"""

    def __init__(self, title: str, time_limit_seconds: Optional[int] = None) -> None:
        self.title = title
        self.questions: List[Question] = []
        self.answers: Dict[int, str] = {}  # Maps question index to submitted answer
        self.time_limit_seconds = time_limit_seconds
        self.start_time: Optional[float] = None

    def add_question(self, question: Question) -> None:
        """Add a question to the quiz, avoiding duplicates"""
        if question not in self.questions:
            self.questions.append(question)

    def get_question(self, index: int) -> Question:
        """Get a question by its index"""
        return self.questions[index]

    def submit_answer(self, question_index: int, answer: str) -> None:
        """Submit an answer for a specific question"""
        # Start timer on first answer submission
        if self.start_time is None:
            self.start_time = time.time()

        self.answers[question_index] = answer

    def get_elapsed_time(self) -> float:
        """Get the elapsed time since the quiz started"""
        if self.start_time is None:
            return 0
        return time.time() - self.start_time
```

```
    def is_time_expired(self) -> bool:
        """Check if the time limit has been exceeded"""
        if self.time_limit_seconds is None:
            return False
        return self.get_elapsed_time() > self.time_limit_seconds

    def get_result(self) -> QuizResult:
        """Calculate and return the quiz result"""
        score = 0
        total = len(self.questions)

        for index, answer in self.answers.items():
            if index < len(self.questions):
                question = self.questions[index]
                if question.check_answer(answer):
                    score += 1

        return QuizResult(score, total)

    def get_questions_by_difficulty(self, difficulty: str) -> List[Question]:
        """Get all questions with a specific difficulty level"""
        return [q for q in self.questions if q.difficulty == difficulty]

    def get_questions_by_category(self, category: Optional[str]) -> List[Question]:
        """Get all questions in a specific category"""
        return [q for q in self.questions if q.category == category]

    def get_incorrect_answers(self) -> List[int]:
        """Get a list of indices for incorrectly answered questions"""
        incorrect = []
        for index, answer in self.answers.items():
            if index < len(self.questions):
                question = self.questions[index]
                if not question.check_answer(answer):
                    incorrect.append(index)
        return incorrect

    def get_answer_details(self, question_index: int) -> Dict:
        """Get detailed information about a specific answer"""
        question = self.questions[question_index]
        submitted_answer = self.answers.get(question_index)

        return {
            "question": question,
            "submitted_answer": submitted_answer,
```

```
            "correct_answer": question.correct_answer,
            "is_correct": question.check_answer(submitted_answer) if submitted_answer
else False,
        }

    def get_score_by_category(self, category: Optional[str]) -> Dict[str, float]:
        """Get the score for questions in a specific category"""
        category_questions = []
        score = 0

        for index, question in enumerate(self.questions):
            if question.category == category:
                category_questions.append(index)
                if index in self.answers and
question.check_answer(self.answers[index]):
                    score += 1

        total = len(category_questions)
        percentage = (score / total * 100) if total > 0 else 0.0

        return {"score": score, "total": total, "percentage": percentage}
```

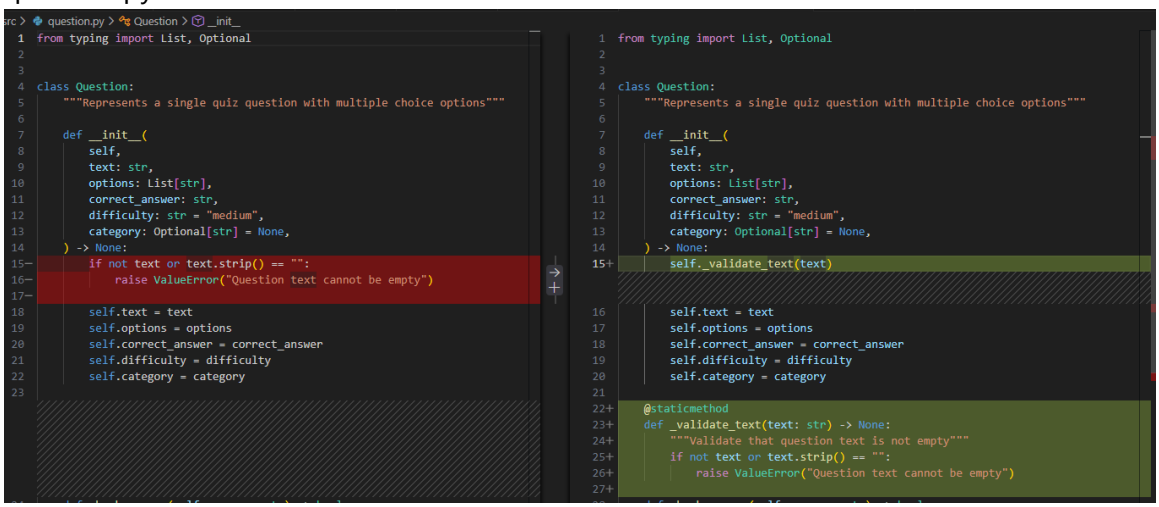
Moduli result.py

```
class QuizResult:
    """Represents the result of a completed quiz"""

    def __init__(self, score: int, total: int) -> None:
        self.score = score
        self.total = total
        self.percentage = (score / total * 100) if total > 0 else 0.0

    def is_perfect(self) -> bool:
        """Check if the score is perfect (100%)"""
        return self.score == self.total

    def is_passing(self, threshold: int = 60) -> bool:
        """Check if the score meets the passing threshold"""
        return self.percentage >= threshold

    def get_summary(self) -> str:
        """Get a formatted summary of the results"""
        return f"Score: {self.score}/{self.total} ({self.percentage:.1f}%)"
```

Refaktorimi i bërë

Refaktorimet e bëra në secilin modul (ana e majtë është kodi i vjetër, ana e djathtë është refaktorimi i bërë):

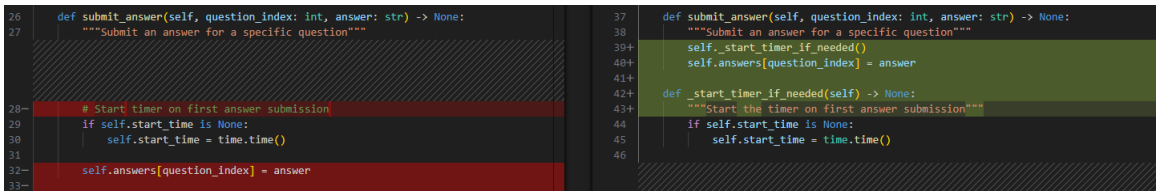
question.py



```
from typing import List, Optional


class Question:
    """Represents a single quiz question with multiple choice options"""

    def __init__(
        self,
        text: str,
        options: List[str],
        correct_answer: str,
        difficulty: str = "medium",
        category: Optional[str] = None,
    ) -> None:
        if not text or text.strip() == "":
            raise ValueError("Question text cannot be empty")

        self.text = text
        self.options = options
        self.correct_answer = correct_answer
        self.difficulty = difficulty
        self.category = category
```

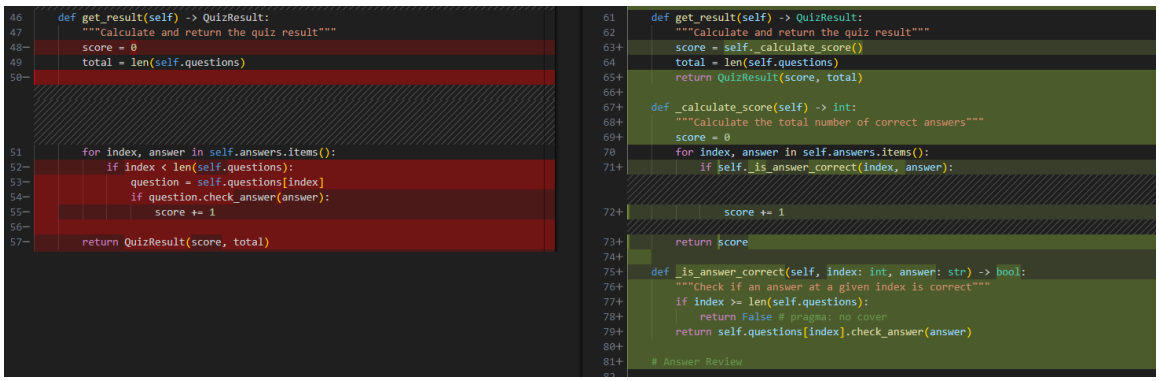
```
from typing import List, Optional


class Question:
    """Represents a single quiz question with multiple choice options"""

    def __init__(
        self,
        text: str,
        options: List[str],
        correct_answer: str,
        difficulty: str = "medium",
        category: Optional[str] = None,
    ) -> None:
        self._validate_text(text)

        self.text = text
        self.options = options
        self.correct_answer = correct_answer
        self.difficulty = difficulty
        self.category = category

    @staticmethod
    def _validate_text(text: str) -> None:
        """Validate that question text is not empty"""
        if not text or text.strip() == "":
            raise ValueError("Question text cannot be empty")
```

quiz.py



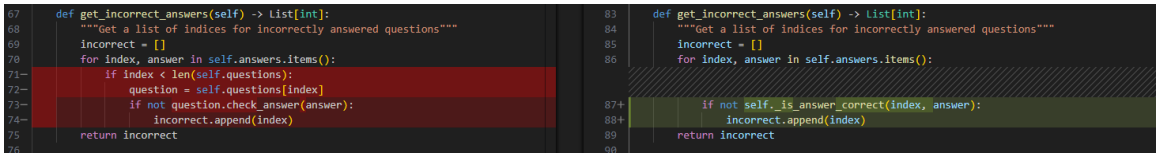
```
    def submit_answer(self, question_index: int, answer: str) -> None:
        """Submit an answer for a specific question"""

        # Start timer on first answer submission
        if self.start_time is None:
            self.start_time = time.time()

        self.answers[question_index] = answer
```

```
    def submit_answer(self, question_index: int, answer: str) -> None:
        """Submit an answer for a specific question"""
        self._start_timer_if_needed()
        self.answers[question_index] = answer

    def _start_timer_if_needed(self) -> None:
        """Start the timer on first answer submission"""
        if self.start_time is None:
            self.start_time = time.time()
```



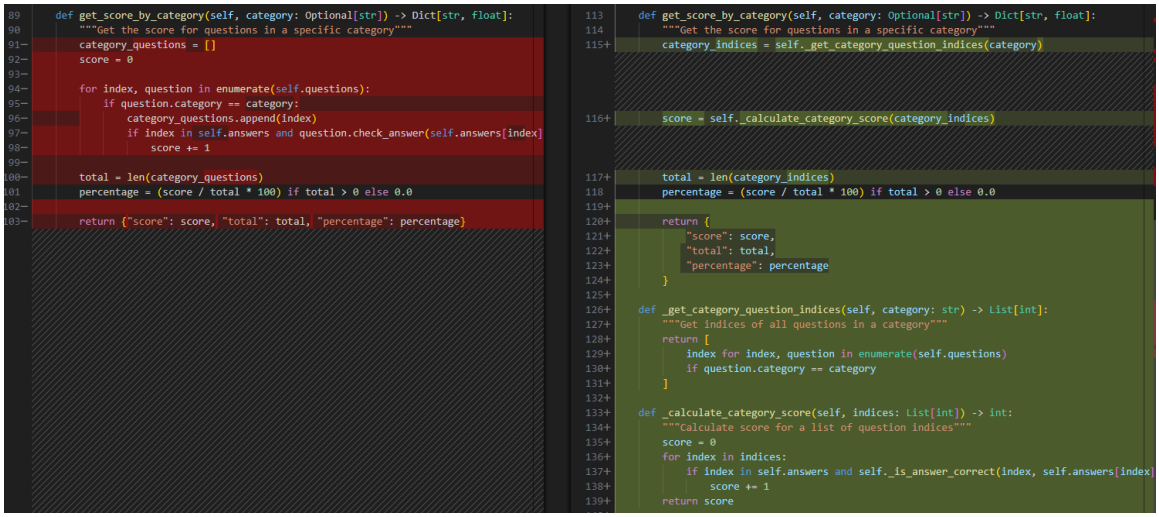
```
    def get_result(self) -> QuizResult:
        """Calculate and return the quiz result"""
        score = 0
        total = len(self.questions)

        for index, answer in self.answers.items():
            if index < len(self.questions):
                question = self.questions[index]
                if question.check_answer(answer):
                    score += 1

        return QuizResult(score, total)
```

```
    def get_result(self) -> QuizResult:
        """Calculate and return the quiz result"""
        score = self._calculate_score()
        total = len(self.questions)
        return QuizResult(score, total)

    def _calculate_score(self) -> int:
        """Calculate the total number of correct answers"""
        score = 0
        for index, answer in self.answers.items():
            if self._is_answer_correct(index, answer):
                score += 1
        return score

    def _is_answer_correct(self, index: int, answer: str) -> bool:
        """Check if an answer at a given index is correct"""
        if index >= len(self.questions):
            return False # pragma: no cover
        return self.questions[index].check_answer(answer)

    # Answer Review
```



```
    def get_incorrect_answers(self) -> List[int]:
        """Get a list of indices for incorrectly answered questions"""
        incorrect = []
        for index, answer in self.answers.items():
            if index < len(self.questions):
                question = self.questions[index]
                if not question.check_answer(answer):
                    incorrect.append(index)
        return incorrect
```

```
    def get_incorrect_answers(self) -> List[int]:
        """Get a list of indices for incorrectly answered questions"""
        incorrect = []
        for index, answer in self.answers.items():
            if not self._is_answer_correct(index, answer):
                incorrect.append(index)
        return incorrect
```



result.py

5 Probleme të hasura

Gjatë shkrimit të testeve dhe implementimit të kodit për feature 2 nuk kam hasur në ndonjë problem.

6 Plani për javën e ardhshme

Gjatë javës tjetër planifikohet të bëhet lidhja e aplikacionit me databazë dhe vurja në funksion e API-ve.

7 Mbulesa e testimit (nëse aplikohet)

• % e mbulesës aktuale: 100%

• Vegla e përdorur: pytest-cov

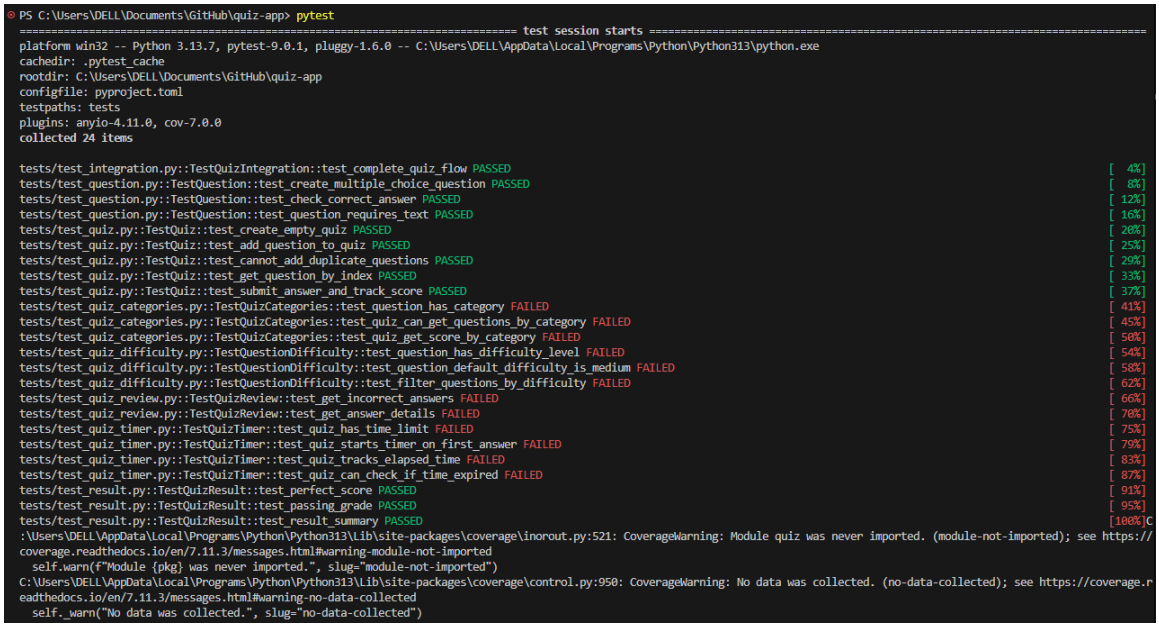
8 Komente / reflektime të grupit

Për këtë javë ka qenë në planifikim të bëhet edhe lidhja e aplikacionit me databazë dhe vurja në funksion e API-ve. Për shkak të ndarjes së punës në mënyrë më të barabartë ndërmjet javëve është vendosur që ky implementim të bëhet javën tjetër (Java 4).

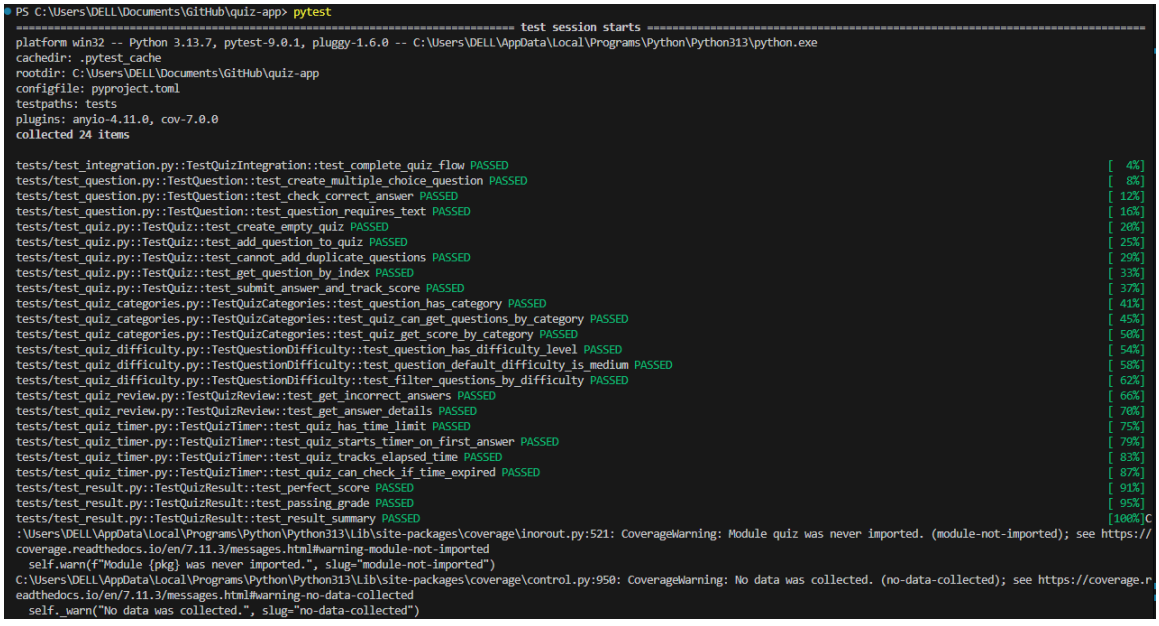
Ngjitjet (opsionale)

- Screenshots nga testet që kalojnë / dështojnë

v3.0 Feature 2 Red Phase (12 testet e krijuara dështojnë):



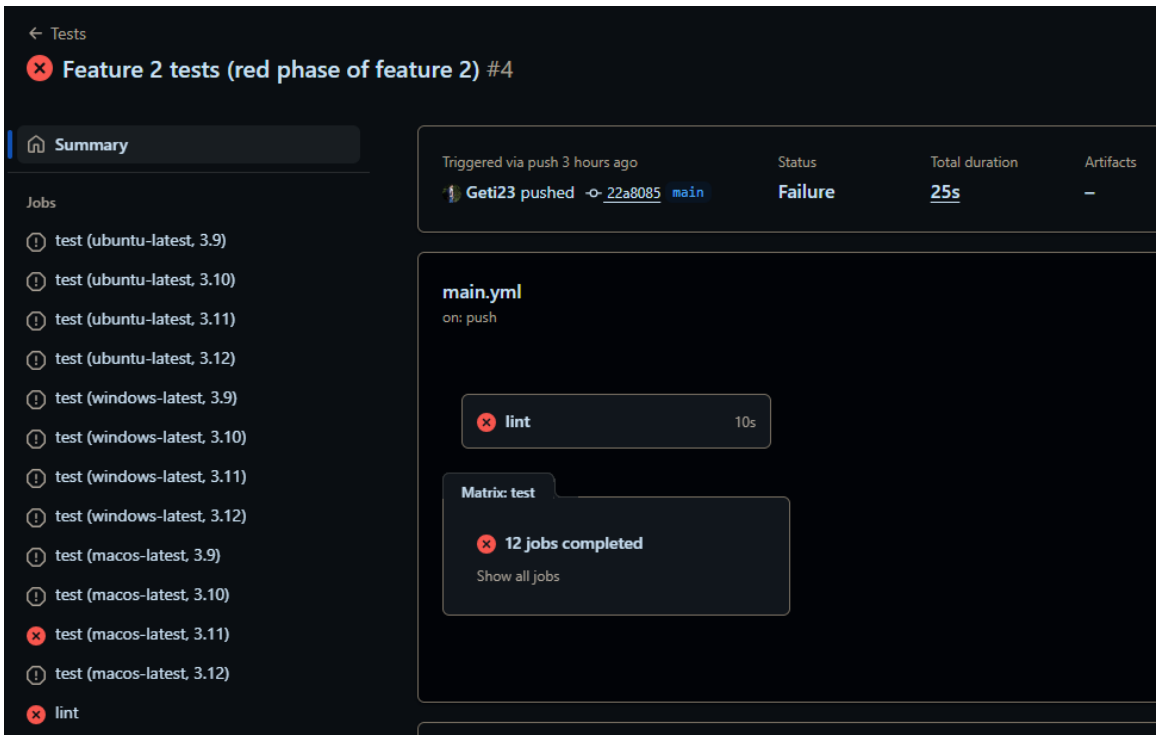
v3.1 Feature 2 Green Phase (të gjitha kalojnë):



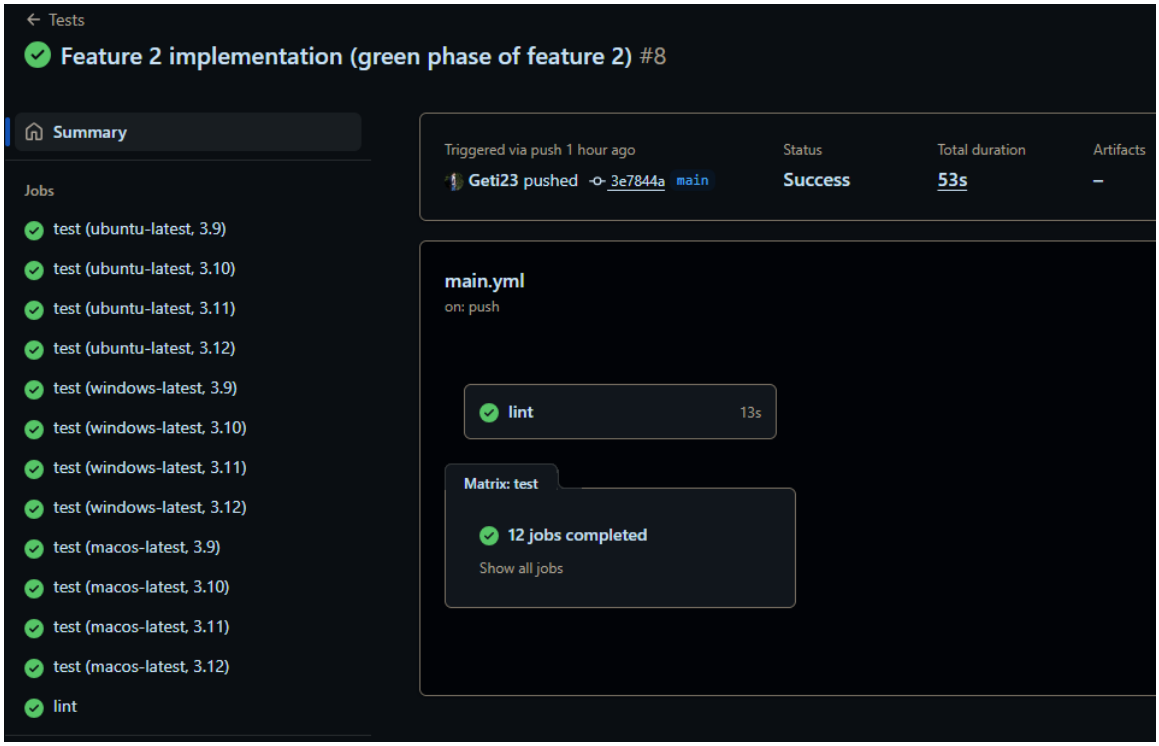
- Link i GitHub-it https://github.com/Geti23/quiz-app

- Raporti i CI/CD ose code coverage (në faqen tjetër):

v3.0 Feature 2 Red Phase



v3.1 Feature 2 Green Phase



Coverage report: 100%

Files | Functions | Classes

coverage.py v7.11.3, created at 2025-11-23 23:22 +0100

File ▲	function	statements	missing	excluded	coverage
src__init__.py	*(no function)*	4	0	0	100%
src\question.py	Question.__init__	6	0	0	100%
src\question.py	Question._validate_text	2	0	0	100%
src\question.py	Question.check_answer	1	0	0	100%
src\question.py	Question.__eq__	2	0	1	100%
src\question.py	Question.__hash__	0	0	1	100%
src\question.py	Question.__repr__	0	0	2	100%
src\question.py	*(no function)*	8	0	1	100%
src\quiz.py	Quiz.__init__	5	0	0	100%
src\quiz.py	Quiz.add_question	2	0	0	100%
src\quiz.py	Quiz.get_question	1	0	0	100%
src\quiz.py	Quiz.submit_answer	2	0	0	100%
src\quiz.py	Quiz._start_timer_if_needed	2	0	0	100%
src\quiz.py	Quiz.get_elapsed_time	2	0	1	100%
src\quiz.py	Quiz.is_time_expired	2	0	1	100%
src\quiz.py	Quiz.get_result	3	0	0	100%
src\quiz.py	Quiz._calculate_score	5	0	0	100%
src\quiz.py	Quiz._is_answer_correct	2	0	1	100%
src\quiz.py	Quiz.get_incorrect_answers	5	0	0	100%
src\quiz.py	Quiz.get_answer_details	3	0	0	100%
src\quiz.py	Quiz.get_questions_by_difficulty	1	0	0	100%
src\quiz.py	Quiz.get_questions_by_category	1	0	0	100%
src\quiz.py	Quiz.get_score_by_category	5	0	0	100%
src\quiz.py	Quiz._get_category_question_indices	1	0	0	100%
src\quiz.py	Quiz._calculate_category_score	5	0	0	100%
src\quiz.py	Quiz.__repr__	0	0	2	100%
src\quiz.py	*(no function)*	22	0	1	100%
src\result.py	QuizResult.__init__	3	0	0	100%
src\result.py	QuizResult._calculate_percentage	1	0	0	100%
src\result.py	QuizResult.is_perfect	1	0	0	100%
src\result.py	QuizResult.is_passing	1	0	0	100%
src\result.py	QuizResult.get_summary	1	0	0	100%
src\result.py	QuizResult.__repr__	0	0	2	100%
src\result.py	*(no function)*	7	0	1	100%
Total		106	0	14	100%

coverage.py v7.11.3, created at 2025-11-23 23:22 +0100