

DIGT2107: Practice of Software Development
Project Iteration 3: Testing and Initial Development
OpenBid

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Course: DIGHT2107 – Fall Term 2025 | **Instructor:** Dr. May Haidar

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1 Introduction

Project Name: OpenBid

Team Number: 1

Team Members: Tyler, Mani, Yanness, Alaister

Document Overview This document outlines the deliverables for Iteration 3, focusing on the initial development phase. It shows how our *test cases* map to the *functional and non-functional requirements* from earlier iterations, and it reports the current working prototype. Goals: implement core functionality tied to high-priority stories, develop comprehensive unit tests, and deliver a working prototype demonstrating traceability.

2 Iteration Goals and Objectives

- Implement core flows: **auth + Duo 2FA, KYC gate** (stubbed via Stripe Identity sandbox token), **post a job, browse on map, place a bid**.
- Develop and run unit tests mapped to requirements (frontend component tests and backend handler tests).
- Deliver a prototype demonstrating requirement \leftrightarrow test case links.

3 Requirement to Test Case Traceability

Tables below map each requirement to the test cases that validate it. Coverage status will be updated as testing completes.

Functional Requirements (FR)

Req ID	Requirement Description	Test IDs	Case	Coverage
FR-001	System shall allow authenticated users to post jobs with title, description, budget, photos, and location.	TC-001, 002	TC-	Partially Covered
FR-002	System shall allow providers to browse jobs on a map with basic filters (radius, category).	TC-003, 004	TC-	Partially Covered
FR-003	System shall allow providers to place bids on open jobs; posters can view and accept a bid.	TC-005, 006	TC-	Partially Covered
FR-004	System shall enforce KYC for all users before posting or bidding.	TC-007, TC-008a-f, TC-009a-b, TC-010a-b, TC-011a-b, TC-012, TC-018a-f		Covered
FR-005	System shall support user authentication with Duo 2FA for sensitive actions.	TC-008		Partially Covered

Req ID	Requirement Description	Test IDs	Case	Coverage
FR-006	System shall provide in-thread messaging per job after acceptance.	TC-009		Planned
FR-007	System shall record ratings and reviews after job completion.	TC-010		Planned
FR-008	System shall allow users to manage their profile including avatar upload and personal information.	TC-019a–d		Covered

Non-Functional Requirements (NFR)

Req ID	Requirement Description	Test IDs	Case	Coverage
NFR-001	Performance: Search/browse should return results within 800 ms P95 for a metro with 5k open jobs (stub data).	TC-011		Planned
NFR-002	Security: Only KYC-verified users can hit write endpoints for jobs/bids.			Planned
NFR-003	Usability: Map view and list view maintain accessible contrast and keyboard navigation for core actions.	TC-013		Planned

Notes

- Each requirement is validated by one or more test cases. Gaps are flagged as *Planned*.
- NFR coverage status is informative only (not required for grading), but we track it to guide future work.

4 Detailed Test Case Descriptions

For brevity we include the highest-priority cases now; the full catalog will live in the repo under `tests/`.

TC-001

Title: Post Job - Valid Inputs

Requirement: FR-001

Preconditions: User is logged in, KYC status = verified.

Steps:

1. Navigate to `/new-job`.
2. Enter valid title, description, budget, and pick a map location (mocked Google Maps).
3. Upload a photo (mock file).
4. Click **Post**.

Expected Result: Job document is created in Firestore; UI redirects to Job Detail.

Actual Result: To be filled after execution.

Status: Pending **Priority:** High

TC-002

Title: Post Job - Validation Errors

Requirement: FR-001

Preconditions: Logged in, KYC verified.

Steps:

1. Navigate to `/new-job`.
2. Leave title empty; click **Post**.

Expected Result: Client-side validation shows error; no write occurs.

Status: Pending **Priority:** High

TC-003

Title: Map Browse - Within Radius

Requirement: FR-002

Preconditions: Seeded jobs exist within 10 km.

Steps:

1. Open `/jobs`.
2. Set radius filter = 10 km.

Expected Result: Pins and list only include jobs within 10 km.

Status: Pending **Priority:** High

TC-004

Title: Map Browse - Category Filter

Requirement: FR-002

Expected Result: Only jobs of selected category are shown.

Status: Pending **Priority:** Medium

TC-005

Title: Place Bid - Valid

Requirement: FR-003

Preconditions: Provider is logged in, KYC verified, job is open.

Expected Result: Bid document created; poster sees bid in Job Detail.

Status: Pending **Priority:** High

TC-006

Title: Accept Bid - Poster Flow

Requirement: FR-003

Expected Result: Job status transitions to **awarded**; winning bid marked **accepted**.
Status: Pending **Priority:** High

TC-007

Title: Duo 2FA Challenge on Sensitive Action

Requirement: FR-005

Preconditions: User logged in without recent 2FA; action = add payout method.

Expected Result: Duo prompt required; action proceeds only on success.

Status: Pending **Priority:** Medium

TC-008a

Test Case ID	TC-008a
Title	KYC Verification - Create Stripe Verification Session
Requirement	FR-004
Preconditions	User is authenticated; KYC status = pending ; real KYC mode enabled.
Steps	<ol style="list-style-type: none">1. Send POST request to <code>/api/kyc/verification</code> with valid auth JWT token.2. System calls Stripe Identity API to create verification session.3. System stores session ID in user record.4. System returns Stripe verification URL and session ID.
Expected Result	Returns Stripe verification URL (<code>https://verify.stripe.com/*</code>) and session ID (vs_*)
Actual Result	Passed - Returns mocked Stripe URL and session ID.
Status	Passed
Priority	High

TC-008b

Test Case ID	TC-008b
Title	KYC Verification - Unauthorized Access
Requirement	FR-004, NFR-002
Preconditions	User not authenticated or invalid token.
Steps	<ol style="list-style-type: none">1. Send POST request to <code>/api/kyc/verification</code> without auth token or with invalid token.
Expected Result	Returns 401 Unauthorized with error message.
Actual Result	Passed - Returns 401 with <code>{error: "unauthorized"}</code> .
Status	Passed
Priority	High

TC-009a

Test Case ID	TC-009a
Title	KYC Status Check
Requirement	FR-004
Preconditions	User is authenticated.
Steps	<ol style="list-style-type: none">1. Send GET request to <code>/api/kyc/status</code> with valid auth JWT token.2. System retrieves user KYC status from database.3. If verification session exists and status is <code>pending</code>, checks Stripe for updated status.4. System returns KYC status (<code>pending</code>, <code>verified</code>, or <code>failed</code>).
Expected Result	Returns KYC status (pending, verified, or failed).
Actual Result	Passed - Returns valid status from database.
Status	Passed
Priority	High

TC-009b

Test Case ID	TC-009b
Title	KYC Status - Unauthorized Access
Requirement	FR-004, NFR-002
Preconditions	User not authenticated.
Steps	<ol style="list-style-type: none">1. Send GET request to <code>/api/kyc/status</code> without auth token.
Expected Result	Returns 401 Unauthorized.
Actual Result	Passed - Returns 401 with error message.
Status	Passed
Priority	High

TC-010a

Test Case ID	TC-010a
Title	Mock KYC Verification
Requirement	FR-004
Preconditions	Prototype = TRUE enabled, and user authenticated.
Steps	<ol style="list-style-type: none">1. Send POST request to <code>/api/kyc/verification</code> with mock auth header.2. System returns mock verification URL instead of calling Stripe.
Expected Result	Returns mock KYC URL (<code>https://mock-kyc.local/session/*</code>) and mock session ID.
Actual Result	Passed - Returns mock URL without Stripe API call.
Status	Passed
Priority	Medium

TC-010b

Test Case ID	TC-010b
Title	Mock KYC Verification - Unauthorized
Requirement	FR-004, NFR-002
Preconditions	Prototype = TRUE enabled, no authentication.
Steps	1. Send POST request to <code>/api/kyc/verification</code> without mock auth header (x-mock-uid).
Expected Result	Returns 401 Unauthorized.
Actual Result	Passed - Returns 401 error.
Status	Passed
Priority	Medium

TC-011a

Test Case ID	TC-011a
Title	Mock KYC Status Check
Requirement	FR-004
Preconditions	Prototype = TRUE enabled, and user authenticated with mock auth header.
Steps	1. Send GET request to <code>/api/kyc/status</code> with mock auth header (x-mock-uid). 2. System retrieves KYC status from mock database without calling Stripe.
Expected Result	Returns KYC status (verified or pending) from mock database.
Actual Result	Passed - Returns status without external API calls.
Status	Passed
Priority	Medium

TC-011b

Test Case ID	TC-011b
Title	Mock KYC Status Check - Unauthorized
Requirement	FR-004, NFR-002
Preconditions	Prototype = TRUE enabled, no authentication.
Steps	1. Send GET request to <code>/api/kyc/status</code> without mock auth header.
Expected Result	Returns 401 Unauthorized.
Actual Result	Passed - Returns 401 error.
Status	Passed
Priority	Medium

TC-012

Test Case ID	TC-012
Title	Mock KYC Force Pass
Requirement	FR-004 (Prototype Mode)
Preconditions	Prototype = TRUE enabled, and user authenticated.
Steps	1. Send POST request to <code>/api/kyc/force-pass</code> . 2. System immediately marks user as KYC verified without Stripe.
Expected Result	User KYC status updated to verified , returns success.
Actual Result	Passed - KYC status updated in mock database.
Status	Passed
Priority	Low

TC-013

Title: Messaging After Acceptance

Requirement: FR-006

Expected Result: Parties can exchange messages in job thread; messages persist in Firestore.

Status: Planned **Priority:** Medium

TC-014

Title: Submit Review on Completion

Requirement: FR-007

Expected Result: Review saved and visible on profile; duplicate review blocked.

Status: Planned **Priority:** Medium

TC-015

Title: Performance P95 - Map Query

Requirement: NFR-001

Expected Result: P95 end-to-end from filter change to results render ≤ 800 ms on stub dataset.

Status: Planned **Priority:** Low

TC-016

Title: Ruleset Audit - No Write Without Claims

Requirement: NFR-002

Expected Result: Firestore rules reject writes missing `kycVerified == true`.

Status: Pending **Priority:** High

TC-017

Title: Accessibility - Keyboard Nav on Map/List

Requirement: NFR-003

Expected Result: Tabbing reaches filters, list items, and primary actions; visible focus outlines present.

Status: Planned **Priority:** Low

TC-018a

Test Case ID	TC-018a
Title	Profile Page - Display KYC Pending Status
Requirement	FR-004
Preconditions	User authenticated, KYC status = pending .
Steps	<ol style="list-style-type: none">1. Navigate to /profile.2. Profile component renders and displays account status section.3. System retrieves user KYC status from session.
Expected Result	KYC status displays "Pending" tag with appropriate styling.
Actual Result	Passed - Profile page correctly displays pending status.
Status	Passed
Priority	High

TC-018b

Test Case ID	TC-018b
Title	Profile Page - Display KYC Verified Status
Requirement	FR-004
Preconditions	User authenticated, KYC status = verified .
Steps	<ol style="list-style-type: none">1. Navigate to /profile.2. Profile component renders with verified KYC status.
Expected Result	KYC status displays "Verified" tag; no action buttons shown.
Actual Result	Passed - Profile page displays verified status correctly.
Status	Passed
Priority	High

TC-018c

Test Case ID	TC-018c
Title	Profile Page - Complete KYC Button Displayed
Requirement	FR-004
Preconditions	User authenticated, KYC status = pending .
Steps	<ol style="list-style-type: none">1. Navigate to /profile.2. System checks KYC status is not verified.3. Profile component renders action buttons.
Expected Result	"Complete KYC" and "Refresh Status" buttons are visible.
Actual Result	Passed - Action buttons displayed for pending status.
Status	Passed
Priority	High

TC-018d

Test Case ID	TC-018d
Title	Profile Page - Initiate KYC Verification
Requirement	FR-004
Preconditions	User authenticated, KYC pending, production mode.
Steps	<ol style="list-style-type: none">1. User clicks "Complete KYC" button.2. System calls <code>/api/kyc/verification</code> endpoint.3. System receives Stripe verification URL.4. System opens URL in new browser tab.
Expected Result	Stripe Identity verification opens in new tab; notification displayed.
Actual Result	Passed - Verification URL opened correctly.
Status	Passed
Priority	High

TC-018e

Test Case ID	TC-018e
Title	Profile Page - Prototype KYC Force Pass
Requirement	FR-004 (Prototype Mode)
Preconditions	Prototype = TRUE, user authenticated, KYC pending.
Steps	<ol style="list-style-type: none">1. User clicks "Complete KYC" button.2. System detects prototype mode.3. System calls <code>/api/kyc/force-pass</code> endpoint.4. System updates user session with verified status.
Expected Result	KYC status immediately updated to verified ; session updated.
Actual Result	Passed - Force pass works correctly in prototype mode.
Status	Passed
Priority	Medium

TC-018f

Test Case ID	TC-018f
Title	Profile Page - Refresh KYC Status
Requirement	FR-004
Preconditions	User authenticated, KYC pending.
Steps	<ol style="list-style-type: none">1. User clicks "Refresh Status" button.2. System calls <code>/api/kyc/status</code> endpoint.3. System receives updated status.4. System updates UI and session with new status.
Expected Result	KYC status refreshed; UI updated with current status.
Actual Result	Passed - Status refresh works correctly.
Status	Passed
Priority	High

TC-019a

Test Case ID	TC-019a
Title	Profile Page - Upload Avatar Successfully
Requirement	FR-008 (User Profile Management)
Preconditions	User authenticated.
Steps	<ol style="list-style-type: none"> 1. User clicks "Change Avatar" button. 2. User selects valid image file (PNG, < 5MB). 3. System uploads file to storage. 4. System updates user profile with avatar URL.
Expected Result	Avatar uploaded; preview displayed; success notification shown.
Actual Result	Passed - Avatar upload successful.
Status	Passed
Priority	Medium

TC-019b

Test Case ID	TC-019b
Title	Profile Page - Reject Large Avatar Files
Requirement	FR-008, NFR-002 (Security)
Preconditions	User authenticated.
Steps	<ol style="list-style-type: none"> 1. User clicks "Change Avatar" button. 2. User selects image file larger than 5MB. 3. System validates file size before upload.
Expected Result	Upload rejected; error message "Image must be smaller than 5MB" displayed.
Actual Result	Passed - Large files rejected correctly.
Status	Passed
Priority	Medium

TC-019c

Test Case ID	TC-019c
Title	Profile Page - Handle Avatar Upload Error
Requirement	FR-008
Preconditions	User authenticated; network/server error occurs.
Steps	<ol style="list-style-type: none"> 1. User selects valid image file. 2. System attempts upload to /api/avatar/upload. 3. Server returns error response.
Expected Result	User-friendly error message displayed; no profile update.
Actual Result	Passed - Error handled gracefully.
Status	Passed
Priority	Medium

TC-019d

Test Case ID	TC-019d
Title	Profile Page - Display Existing Avatar
Requirement	FR-008
Preconditions	User authenticated; avatar URL exists in profile.
Steps	<ol style="list-style-type: none">1. Navigate to <code>/profile</code>.2. System retrieves user avatar URL from database.3. Profile component renders avatar image.
Expected Result	User's avatar displayed in profile header.
Actual Result	Passed - Existing avatar displayed correctly.
Status	Passed
Priority	Low

5 Code Repository and Branching Strategy

Repository: <https://github.com/your-org/openbid> (*placeholder*)

Branches:

- `main`: stable releases.
- `develop`: ongoing integration.
- `feature/{slug}`: e.g., `feature/auth`, `feature/map`, `feature/bids`, `feature/kyc`, `feature/tests`.

6 Task Allocation and Timeline

Pair-Programming Rotation (weekly): two pairs; driver/navigator swap daily; Scrum Master rotates weekly (Tyler → Mani → Yanness → Alaister).

Sprint Plan (3 weeks for Iteration 3)

- **Week 1:** Implement auth + Duo 2FA hook, KYC gate stub, Post Job UI/API, initial tests (TC-001, TC-002, TC-007, TC-008).
- **Week 2:** Map browse (pins, filters), Place Bid flow, tests (TC-003, TC-004, TC-005, TC-006, TC-012).
- **Week 3:** Prototype hardening, accessibility pass (keyboard focus), performance harness scaffolding, test documentation (TC-011, TC-013 planning).

Task Breakdown (examples)

- Frontend: NewJob form, MapView, JobList, Bid modal, validation.
- Backend (Express on Firebase Functions/Cloud Run): endpoints for jobs, bids; KYC/Duo middleware.
- Firestore rules: enforce `kycVerified == true` for job/bid writes.
- Testing: Vitest/Jest + React Testing Library for UI; supertest for API; rules-unit-testing for Firestore.

- Docs: update traceability, add test run notes.

7 Prototype Overview

Stack (MVP): React + SCSS (Firebase Hosting), Node.js + Express (Firebase Functions or Cloud Run), Firestore, Google Maps JS, Stripe (Connect/Identity), Duo 2FA.

Implemented in Iteration 3 (target)

- Auth shell with Duo challenge on sensitive action.
- KYC gate (UI + rules) using a sandbox token flow.
- Post Job UI + server write; basic Job Detail.
- Map browse with radius/category filters on seeded data.
- Place Bid basic happy path.

8 Submission Guidelines

- **GitHub:** Push code and documentation; tag release as ITR2.1.
- **eClass PDF:** include *Prototype Overview*, *Updated Requirements/Use Cases*, *Test Plan and (initial) Results*, and *Updated Iteration Plan/Backlog*.

Appendix A: Test Skeletons (illustrative)

Frontend (React Testing Library)

```
import { render, screen, fireEvent } from '@testing-library/react'
import NewJob from '../src/pages/NewJob'

test('TC-002: shows validation error when title empty', async () => {
  render(<NewJob />)
  fireEvent.click(screen.getByRole('button', { name: /post/i }))
  expect(await screen.findByText(/title is required/i)).toBeInTheDocument()
})
```

API (Express + supertest)

```
import request from 'supertest'
import app from '../functions/app'

test('TC-007: blocks job create when kyc not verified', async () => {
  const token = await getAuthToken({ kycVerified: false })
  const res = await request(app)
    .post('/jobs')
    .set('Authorization', 'Bearer ${token}')
    .send({ title: 'Yard help', ... })
  expect(res.status).toBe(403)
})
```

Firestore Rules (rules-unit-testing)

```
it('TC-012: rejects write without kycVerified', async () => {
  const db = authedDB({ uid: 'u1', kycVerified: false })
  const ref = db.collection('jobs').doc('j1')
  await assertFails(ref.set({ title: 'T', ... }))
})
```

KYC Routes (Express + supertest + Jest)

```
import request from 'supertest'
import express from 'express'

// TC-008a: Create Stripe verification session
test('should return Stripe verification URL', async () => {
  const response = await request(app)
    .post('/api/kyc/verification')
    .set('Authorization', 'Bearer fake-token')
    .expect(200)

  expect(response.body.url).toContain('https://verify.stripe.com/')
  expect(response.body.sessionId).toContain('vs')
})

// TC-009a: Check KYC status
test('should return KYC status', async () => {
  const response = await request(app)
    .get('/api/kyc/status')
    .set('Authorization', 'Bearer fake-token')
    .expect(200)

  expect(['verified', 'pending', 'failed'])
    .toContain(response.body.status)
})

// TC-008b: Unauthorized access
test('should reject unauthorized user', async () => {
  mockAuth.auth.verify.mockResolvedValue(null)

  const response = await request(app)
    .post('/api/kyc/verification')
    .expect(401)

  expect(response.body.error).toBe('unauthorized')
})
```