Computing Fundamentals-CO1101

Coursework 2 (Individual)

Submission Deadline: 27 Nov 2024, 12:00 PM

Objective

This assessment evaluates your skills in developing a responsive banking website integrated with shell scripting. The website will be built using *HTML5*, *CSS*, *JavaScript*, and *jQuery*, while shell scripting tasks are to be completed using a *Unix/Linux* environment or an *online compiler*.

Note: The use of Generative AI (e.g., ChatGPT, DALL-E) is strictly prohibited for this assignment. All work must be independently completed by the student.

Submission Instructions

Submit a zipped file containing all **HTML, CSS, JavaScript, jQuery**, and **shell scripts** by **27 Nov 2024 at 12:00 PM**.

Assessment Structure

This assessment consists of two main parts:

1. **Web Development (80%)**
2. **Shell Scripting (20%)**

Part 1: Web Development (80%)

Project Requirements

- **General Website Requirements:** Create a responsive, accessible banking website using **HTML5**, **CSS**, **JavaScript**, and **jQuery**.
- Include a consistent navigation menu on each page for smooth navigation.

Required Pages

- **Home Page:** Introduce the bank with an overview of services and a link to the mortgage calculator.
- **Mortgage Calculator:** A tool where users enter loan details and income to assess eligibility, monthly payments, and expense breakdown.
- **About Us:** A page detailing the bank's history, mission, and values.
- **Contact Us:** A contact form for user inquiries, with client-side validation.
- **Services:** Summaries of other banking services (e.g., savings accounts, loans).
- **FAQ:** Frequently asked questions about the bank's services.

Detailed Page Requirements

1. **Home Page:**
    - Include a hero section with a welcoming banner and a link to the mortgage calculator.
2. **Enhanced Mortgage Calculator Page (Fixed Interest Rate of 4.5%):**
    - **Inputs:** Collect inputs for Loan Amount, Loan Term (in years), and Monthly Income.
    - **Eligibility Calculation:** Calculate monthly payments, assess eligibility, and display an expense breakdown.
    - **Error Handling:** Use JavaScript and jQuery to ensure valid inputs.
3. **About Us Page:** Describe the bank's background, mission, and values.
4. **Contact Us Page:**
    - Provide a contact form with fields for name, email, subject, and message. Implement form validation.

5. **Services Page:** Summarise additional banking services, adding interactive details using jQuery animations.

6. **FAQ Page:** Create an accordion-style FAQ section.

Design & Styling Requirements (CSS)

- Use a cohesive colour palette and a professional layout to reflect a trustworthy bank website.

JavaScript & jQuery Requirements

- Implement the mortgage eligibility logic with a fixed interest rate of 4.5%.
- Validate form inputs and add interactive animations (e.g., Contact us and Mortgage calculator pages).

Mortgage Calculator Formula and Eligibility Check

The mortgage calculator should use the following formula to calculate the *Monthly Payment* based on a fixed annual interest rate, the loan amount, and the loan term:

$$\text{Monthly Payment} = \frac{P \cdot r \cdot (1+r)^n}{(1+r)^n - 1}$$

where:

- P = Loan Amount
- r = Monthly Interest Rate (annual interest rate divided by 12 months, e.g., for 4.5% annual rate, $r = \frac{0.045}{12}$)
- n = The number of monthly payments (number of years multiplied by 12)

The *Monthly Payment* calculated from this formula represents the amount the borrower must pay each month to repay the loan with interest over the specified term.

Eligibility Check

To determine if the loan is affordable, the calculator should check that the *Monthly Payment* does not exceed 30% of the *Monthly Income*. If the *Monthly Payment* is greater than 30% of the *Monthly Income*, the loan should be considered unaffordable, and a message should be displayed.

For example, with:

- **Monthly Income**: £4,000

- **30% Threshold**: $0.30 \times 4000 = 1200$

The *Monthly Payment* must be less than or equal to £1,200 for the loan to be considered affordable. If the *Monthly Payment* exceeds £1,200, display the message:

> *"Loan denied: Monthly payment exceeds 30% of your income."*

If the monthly payment falls within the acceptable range ($\leq 30\%$ of income), the calculator should proceed with displaying the full breakdown, including total payment, total interest, and remaining income after expenses.

Part 2: Shell Scripting (20%)

This section evaluates your basic shell scripting skills, which can be completed in a Unix/Linux environment or on an online shell scripting compiler.

Shell Scripting Tasks

Q1. File Organiser Script (10%)
Write a shell script called `organize_files.sh` that prints messages indicating the file organisation based on file extension. Instead of actually moving files, the script should output a message for each file type. For example:

- For each `.txt` file, print: "Moving file.txt to Text_Files folder".
- For each `.jpg` file, print: "Moving image.jpg to Images folder".

Define a list of sample filenames in an array and loop through each, using `if` statements to determine file extensions.

Q2. Disk Usage Checker Script (10%)
Write a shell script named `disk_usage.sh` that defines a variable `disk_usage` representing the current disk usage percentage (e.g., 85). The script should:

- Compare `disk_usage` to a threshold value (e.g., 80), and print a warning message if `disk_usage` exceeds the threshold.
- Example output: "Warning: Disk usage is at 85%, which exceeds the threshold!".

Marking Criteria

Criteria	Fail (Below 40%)	Pass (40-49%)	Merit (50-69%)	Distinction (Above 70%)
HTML5 Structure (20%)	Incomplete structure; missing required pages or semantic tags; accessibility issues.	Basic structure with minimal semantic tags; only partially meets page requirements.	Good use of HTML5 structure with appropriate semantic tags; meets most requirements and accessibility standards.	Excellent HTML structure with complete pages, effective semantic tags, and full accessibility compliance.
CSS Styling and Responsiveness (20%)	Disorganised styling; no responsiveness; inconsistent or unprofessional layout.	Basic styling and minimal responsiveness; some layout inconsistencies.	Good styling with cohesive layout and responsiveness; professional colour and font choices.	Highly polished styling with a fully responsive and professional layout; cohesive colour palette reflecting brand consistency.
JavaScript & jQuery Interactivity (20%)	Minimal interactivity; incomplete or incorrect validation; errors in logic.	Basic interactivity with limited validation.	Good interactivity and effective form validation.	Advanced interactivity; accurate form validation; seamless user experience.
Mortgage Calculator Logic (10%)	Incorrect or missing calculation logic; fails eligibility checks; major calculation errors.	Basic calculation logic; eligibility check is present but lacks accuracy.	Functional calculation with accurate eligibility check; mostly accurate outputs.	Accurate calculation logic, fully correct eligibility check, and a clear expense breakdown.
Shell Scripting (20%)	Scripts incomplete or incorrect; no clear output; errors present.	Basic functionality with minor issues in file organisation or disk check outputs.	Correct functionality with clear output; file organisation and disk usage check scripts work as expected.	Fully functional scripts with clear, accurate outputs and effective comments for readability.
Accessibility & UX (10%)	Poor layout; lacks accessibility features; hard to navigate.	Basic accessibility; limited navigation; some accessibility issues.	Good accessibility with clear navigation; includes accessible features.	Fully accessible with smooth navigation.