“Test Documentation”

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a) Assessment of the Need for a Testing Program.

The Need for a Testing Program is to test whether the program meets the requirements made by the company, UrbanFurn, to be able to allow:

- Employees to input the number of hours worked.
- Select shift number for pay rate: R50/hr (1st shift), R70/hr (2nd shift), R90/hr (3rd shift).
- Overtime if (hours worked > 40 hrs) paid at 1.5x rate.
- Optional retirement plan for 2nd and 3rd shifts, deducting 5% from gross pay.

Calculation Logic:

- Regular pay based on hourly rates.
- Overtime pays at 1.5x for hours over 40.
- Retirement contribution deducted if opted in.

Output:

- Display breakdown of hours, shift, rates, regular and overtime pay, retirement deduction, and net pay.

Storage:

- Record the hours worked each time the program runs.

Number of users

- This program has been designed to handle any number of users, due to the random rate of employee and the nature of work

b) Developing a Test Strategy.

Cycle 1: New Data Testing

This is used to check if the program can correctly handle new data inputs and calculations the payment as intended.

Steps:

- Having different inputs for the number of hours worked.
- Selecting each of the shift number and test the hourly rates and the overtime calculations.
- Testing the retirement plan option and its calculations for both shifts 2 and 3.
- Checking the accuracy of the regular, the overtime, and the net pay calculations.
- Making sure that the proper validating of invalid inputs (e.g., non-numeric characters, and/or negative numbers).

Cycle 2: Existing Data Testing

This makes sure that the program can handle previously processed data and calculates with stored information.

Steps:

- Re-inputting different data that has already been processed to check for the consistency.
- Creating different scenarios where data is saved and reprocessed (e.g., re-running calculations for a previous pay period).
- Confirming that the program does not crash out or create incorrect results with pre-existing data.

Error and Crash Checking:

- Testing for boundary values (e.g., exactly 40 hours, exactly 0 hours).
- Testing extreme values (e.g., very high numbers of hours worked).
- Testing human/user errors (e.g., entering text where numbers are expected).

c) Recording Test Results.

Cycle 1: New Data Testing

Test Case 1

- Input Conditions: Hours: 45, Shift: 2, Retirement: Yes
- Expected Outcome: Hourly Pay Rate: R70.0, Regular Pay: R2800.0, Overtime Pay: R525.0, Total Pay: R3325.0, Retirement Deduction: R166.25, Net Pay: R3158.75
- Actual Outcome: Hourly Pay Rate: R70.0, Regular Pay: R2800.0, Overtime Pay: R525.0, Total Pay: R3325.0, Retirement Deduction: R166.25, Net Pay: R3158.75
- Errors: None

```
run:
Enter your number of hours worked: 45

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
2

Would you like to participate in the retirement plan? (yes/no): Yes

-----------------------------------------
Hours Worked: 45
Shift: 2
Hourly pay rate: R70.0
Regular pay: R2800.0
Overtime pay: R525.0
Total of regular and overtime pay: R3325.0
Retirement deduction: R166.25
Net pay: R3158.75
BUILD SUCCESSFUL (total time: 18 seconds)
```

Test Case 2

- Input Conditions: Hours: 38, Shift: 1
- Expected Outcome: Hourly Pay Rate: R50.0, Regular Pay: R1900.0, Overtime Pay: R0.0, Total Pay: R1900.0, Retirement Deduction: R95.0, Net Pay: R1805.0
- Actual Outcome: Hourly Pay Rate: R50.0, Regular Pay: R1900.0, Overtime Pay: R0.0, Total Pay: R1900.0, Retirement Deduction: R95.0, Net Pay: R1805.0
- Errors: None

```
run:
Enter your number of hours worked: 38

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
1

----------------------------------------
Hours Worked: 38
Shift: 1
Hourly pay rate: R50.0
Regular pay: R1900.0
Overtime pay: R0.0
Total of regular and overtime pay: R1900.0
Retirement deduction: R95.0
Net pay: R1805.0
BUILD SUCCESSFUL (total time: 11 seconds)
```

Test Case 3

- Input Conditions: Hours: 50, Shift: 3, Retirement: No
- Expected Outcome: Hourly Pay Rate: R90.0, Regular Pay: R3600.0, Overtime Pay: R1350.0, Total Pay: R4950.0, Retirement Deduction: R0.0, Net Pay: R4950.0
- Actual Outcome: Hourly Pay Rate: R90.0, Regular Pay: R3600.0, Overtime Pay: R1350.0, Total Pay: R4950.0, Retirement Deduction: R0.0, Net Pay: R4950.0
- Errors: None

```
run:
Enter your number of hours worked: 50

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
3

Would you like to participate in the retirement plan? (yes/no): no

-----------------------------------------
Hours Worked: 50
Shift: 3
Hourly pay rate: R90.0
Regular pay: R3600.0
Overtime pay: R1350.0
Total of regular and overtime pay: R4950.0
Retirement deduction: R0.0
Net pay: R4950.0
BUILD SUCCESSFUL (total time: 7 seconds)
```

Test Case 4

- Input Conditions: Hours: 9, Shift: 0
- Expected Outcome: Invalid option. Please choose 1, 2, or 3.
- Actual Outcome: Invalid option. Please choose 1, 2, or 3.
- Errors: None

```
run:
Enter your number of hours worked: 9

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
0

Invalid option. Please choose 1, 2, or 3.
```

Test Case 5

- Input Conditions: Hours: -5, Shift: 2
- Expected Outcome: Invalid option. Number of hours has to be a > 1.
- Actual Outcome: Invalid option. Number of hours has to be a > 1.
- Errors: None

```
run:
Enter your number of hours worked: -5

Invalid option. Number of hours has to be a > 1.
```

Cycle 2: Existing Data Testing

Test Case 1

- Input Conditions: Hours: 45, Shift: 2, Retirement: Yes

- Expected Outcome: Hourly Pay Rate: R70.0, Regular Pay: R2800.0, Overtime Pay: R525.0, Total Pay: R3325.0, Retirement Deduction: R166.25, Net Pay: R3158.75

- Calculations:
  R2800.0 (Regular Pay) = 70 (Hourly Pay Rate) * 45
  R67,5 (Overtime Rate) = 45 (Hours Worked) * 1.5
  R525.0 (Overtime Pay) = (45 (Hours Worked) - 40) * 67,5 (Overtime Rate)
  R3325.0 (Total Pay) = R2800.0 (Regular Pay) + R525.0 (Overtime Pay)
  R166.25 (Retirement Deduction) = 3325.0 (Total Pay) * 0.05
  R3158.75 (Net Pay) = 3325.0 (Total Pay) - 166.25 (Retirement Deduction)

- Actual Outcome: Hourly Pay Rate: R70.0, Regular Pay: R2800.0, Overtime Pay: R525.0, Total Pay: R3325.0, Retirement Deduction: R166.25, Net Pay: R3158.75

- Errors: None

```
run:
Enter your number of hours worked: 45

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
2

Would you like to participate in the retirement plan? (yes/no): Yes

-----------------------------------------
Hours Worked: 45
Shift: 2
Hourly pay rate: R70.0
Regular pay: R2800.0
Overtime pay: R525.0
Total of regular and overtime pay: R3325.0
Retirement deduction: R166.25
Net pay: R3158.75
BUILD SUCCESSFUL (total time: 18 seconds)
```

Test Case 2

- Input Conditions: Hours: 38, Shift: 1

- Expected Outcome: Hourly Pay Rate: R50.0, Regular Pay: R1900.0, Overtime Pay: R0.0, Total Pay: R1900.0, Retirement Deduction: R95.0, Net Pay: R1805.0

- Calculations:
  R1900.0 (Regular Pay) = 50 (Hourly Pay Rate) * 38
  R1900.0 (Total Pay) = R1900.0 (Regular Pay) + R0.0 (Overtime Pay)
  R95.0 (Retirement Deduction) = 1900.0 (Total Pay) * 0.05
  R1805.0 (Net Pay) = 1900.0 (Total Pay) - 95.0 (Retirement Deduction)

- Actual Outcome: Hourly Pay Rate: R50.0, Regular Pay: R1900.0, Overtime Pay: R0.0, Total Pay: R1900.0, Retirement Deduction: R95.0, Net Pay: R1805.0

- Errors: None

```
run:
Enter your number of hours worked: 38

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
1

----------------------------------------
Hours Worked: 38
Shift: 1
Hourly pay rate: R50.0
Regular pay: R1900.0
Overtime pay: R0.0
Total of regular and overtime pay: R1900.0
Retirement deduction: R95.0
Net pay: R1805.0
BUILD SUCCESSFUL (total time: 11 seconds)
```

Test Case 3

- Input Conditions: Hours: 50, Shift: 3, Retirement: No

- Expected Outcome: Hourly Pay Rate: R90.0, Regular Pay: R3600.0, Overtime Pay: R1350.0, Total Pay: R4950.0, Retirement Deduction: R0.0, Net Pay: R4950.0

- Calculations:
  R3600.0 (Regular Pay) = 90 (Hourly Pay Rate) * 50
  R75 (Overtime Rate) = 50 (Hours Worked) * 1.5
  R1350.0 (Overtime Pay) = (50 (Hours Worked) - 40) * 75 (Overtime Rate)
  R4950.0 (Total Pay) = 3600.0 (Regular Pay) + 1350.0 (Overtime Pay)
  R4950.75 (Net Pay) = 4950.0 (Total Pay) – 0.0 (Retirement Deduction)

- Actual Outcome: Hourly Pay Rate: R90.0, Regular Pay: R3600.0, Overtime Pay: R1350.0, Total Pay: R4950.0, Retirement Deduction: R0.0, Net Pay: R4950.0

- Errors: None

```
run:
Enter your number of hours worked: 50

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
3

Would you like to participate in the retirement plan? (yes/no): no

-----------------------------------------
Hours Worked: 50
Shift: 3
Hourly pay rate: R90.0
Regular pay: R3600.0
Overtime pay: R1350.0
Total of regular and overtime pay: R4950.0
Retirement deduction: R0.0
Net pay: R4950.0
BUILD SUCCESSFUL (total time: 7 seconds)
```

Test Case 4

- Input Conditions: Hours: 9, Shift: 0
- Expected Outcome: Invalid option. Please choose 1, 2, or 3.
- Actual Outcome: Invalid option. Number of hours has to be a > 1.
- Errors: The wrong display message is shown.
- Fix: Display the appropriate message

Before:

```
run:
Enter your number of hours worked: 9

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
0

Invalid option. Number of hours has to be a > 1.
```

After:

```
run:
Enter your number of hours worked: 9

Enter your shift number (1, 2, or 3):
1 - First shift
2 - Second shift
3 - Third shift
0

Invalid option. Please choose 1, 2, or 3.
```

Test Case 5

- Input Conditions: Hours: -5, Shift: 2
- Expected Outcome: Invalid option. Number of hours has to be a > 1.
- Actual Outcome: Invalid option. Number of hours has to be a > 1.
- Errors: None

```
run:
Enter your number of hours worked: -5

Invalid option. Number of hours has to be a > 1.
```