Summative Assessment 4

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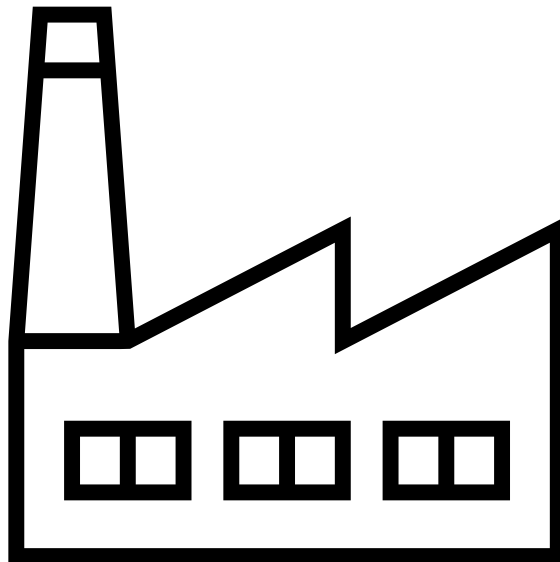
Planning

Question 1

Contents

a) Problem Statement

UrbanFurn is a local factory in Cape Town, concerned with the manufacturing of furniture. They've recently taken note of a persistent error in their payroll department, that is causing strain between management and their dedicated workforce.

There is a resurfacing error with the overtime pay, in which numerous instances have been reported of overtime hours not being reflected accurately within the workers' pay checks.

This is triggering frustration and dissatisfaction among the factory workers and has led to heated discussions during lunch breaks and post-shift meetings, which has only further exacerbated the growing unrest among the workforce.

This issue has also impacted the financial stability of workers, who have taken time to conform to longer working hours to make ends meet, as well as their morale seeing as their hard work is not producing a favourable outcome.

b) Data Requirements and Functionality

The main data variables that will be used throughout the program will be the user's hours that they work (which will be called "hours") and their shift number (which will be called "shift").

The shift categories run from 1st to 3rd, each having its own hourly rate. The first shift has a rate of R50 per hour, the second shift has a rate of R70 per hour, and the third shift has a rate of R90 per hour.

The user will enter the hours worked, and then the shift number. The regular payroll will be the product of the shift's hourly rate and the hours worked. The program will display the hourly rate, as well as their regular payroll.

Should the hours exceed 40, the amount exceeding 40 will be produced by one and one-half of the shift rate. Their payroll for overtime will also be displayed, alongside the sum of their overtime payroll and regular payroll.

Should the user be working the 2nd or 3rd shift, they will have the option to apply for the retirement plan, in which their payroll, whatever the total may be, will be reduced by 5%, in which the value will go towards their retirement fund.

The net pay will display at the end after all calculations have been performed, and the relevant information has been displayed accordingly.

c) Viability Evaluation

i. The Product

The product that is to be created is an employee payroll calculator, that calculates an employee's payroll by taking their overtime working hours, shift number, and retirement fund into account.

Products similar to this employee payroll calculator already exist, however, this program is unique seeing as its functions and features are adapted specifically for UrbanFurn, by already having the specific hourly rates for the different shifts.

ii. Constraints

There are a limited number of constraints for the development of this program. The main limitation is that the program can only receive information via Scanner input. This does not limit other aspects of the program; therefore, it is viable in terms of its technical feasibility.

iii. Resources Required

The resources required to produce this product would simply include a laptop alongside an appropriate IDE compatible with the latest iteration of Java SE Development. Both of these items are available without additional costs.

d) Economic Viability

i.   Cost of Development

Two solutions have been created for the program to work. The average hourly rate for a software developer in South Africa amounts to about R286 per hour. Two solutions have been planned for UrbanFurn's desired program, and four days have been allocated by the company for the development of the application.

The first solution requires more classes and thus took the most amount of time. Throughout the four days, 10 hours a day would be required for the development of the employee payroll calculator.

The second solution requires fewer classes and fewer methods, resulting in a less complex and smoother development process. The development of this solution would require 8 hours a day.

ii.   Benefits of Program

Considering that the creation of the program is a once-off process, there will only be one once-off payment. This means that no other payments will be necessary for the maintenance of the program. The profits that UrbanFurn will receive will certainly surpass the cost of this application's development.

With the existence of the program, the employee's morale at UrbanFurn will increase exponentially. The production of work and the execution of their work ethic are directly proportional, meaning that the company will accumulate more profits and employee satisfaction will return promptly.

It would be feasible to produce this program seeing that the benefits of the program outweigh its cost of production.

e) Solution Selection

Two potential solutions for the development of this program have been planned. Both of which require the same resources and produce the same outputs. The first solution however is just more complicated to produce, and the second solution is less complicated and will run smoother.

To develop the first solution, it would require 10 hours a day to develop, in a four-day development cycle. Considering that the average software developer is paid approximately R286 per hour, the cost of this solution's development would amount to:

R286 x 10 x 4 = R11, 728

To develop the second solution, it would require only 10 hours a day to develop, in a four-day development cycle. Considering that the average software developer is paid approximately R286 per hour, the cost of this solution's development would amount to:

R286 x 8 x 4 = R9, 152

The main differences in the development of these two solutions lie in the cost of production and the complexity thereof. Considering that the second solution is less complex and cheaper, it would be in UrbanFurn's best interest to choose the second solution.

This is because the integration into their systems will result in less complications, and the potential return on this investment will be higher.