**SD1 Programming**

**Exercise Sheet 2**

1. Write a program, which calculates the discount, if any, on a sale. Sales of €100 and over are eligible for a 10% discount.

Objects : price, discount = 0.0, discountRate = 10;

* 1. get price
  2. if price 100 or over
     1. calculate discount

**discount = price \* (discountRate/100)**

* 1. display discount

1. To calculate a monthly electricity bill, a standing charge of €20 is added to a charge of €0.05 per unit of electricity used. The number of units used is based on the difference between a previous and present meter reading. The meter has a maximum reading of 9999, after which it returns to 0000. Write a program that will accept as input a pair of values representing the previous and present meter readings respectively. The program should then calculate and display an electricity bill. Allow for the fact that the previous meter reading may be greater than the present reading if the meter has passed 9999 and returned to 0000. Assume that 10000 units of electricity will never be used in one month.

Objects : stdCharge = 20, unitCharge =0.05, bill

previousReading , presentReading

* 1. Get meter readings
  2. if meter has turned
     1. adjust present by 10000
  3. Calculate bill

bill = stdCharge + (present – previous) \* unitCharge

* 1. Display bill

1. Write a program that accepts as input a pair of integer values. If the first value is smaller than the second, the program should swap the two values. The program should then display the values in descending order

Objects: value1, value2, temp

* 1. Get values
  2. if vaue1 is less than value2
     1. swap values
  3. display values in descending order i.e. largest first

Objects: value1, value2, temp

1. Get values
2. if vaue1 is less than value2
   * 1. assign value1to temp
     2. assign value2 to value1
     3. assign temp to value2
3. display values in descending order i.e. largest first
4. A company’s employees are treated as either salaried or waged. A salaried employee has an annual salary and is paid monthly. A waged employee is paid an hourly rate and works up to a maximum of 40 hours per week. Both types of employee have an annual tax free allowance and a tax rate of 41%. Write a program that calculates and displays either the employee’s monthly salary or weekly wage as appropriate. The program should first ask an employee to enter S or W too indicate his type. On entry of his type, the program should then ask for the necessary additional information required to complete the calculation.

Objects: employeeType, taxFreeAllowance, taxRate = 41;

annualSalary, hourlyRate, hoursWorked, grossPay, taxDue, netPay

* 1. Get employee type
  2. Get tax free allowance
  3. if salaried
     1. process salaried employee

else

1. process waged employee
   1. display net pay
2. Get employee type
3. Get tax free allowance
4. if salaried
   * 1. get annual salary
     2. Calculate gross pay

gross Pay = annualSalary / 12

* + 1. calculate tax due

taxDue = (grossPay– taxfreeAllowance/12) \* taxRate/100

* + 1. calculate net pay

netPay = grossPay - taxDue

else

1. get hourly rate and hours worked
2. Calculate gross pay

grossPay = hourlyRate \* hoursWorked

iii calculate tax due

taxDue = (grossPay – taxFreeAllowance/52) \* taxRate/100

1. calculate net pay

netPay = grossPay – taxDue;

1. display net pay
2. Extend your solution to question 4 to allow for overtime to be paid to waged employees for hours worked over 40 hours at 1.5 times the hourly rate.

in c in else after ii add

iii if greater than 40 hours worked

1. top up grossPay with overtime

grossPay += (hoursWorked – 40) \* hourlyRate \* 0.5

1. An applicant will not be accepted for car insurance if he is under 21 years of age or has accumulated more than 4 penalty points. Write a program that will accept as input a person’s age and the number of penalty points he holds. The program should then display a message indicating whether or not he is eligible for an insurance policy.

Objects: age, points

* 1. Get age and points
  2. if underage OR high points
     1. display rejection message

else

1. display acceptance message
2. The car insurance policy in question 6 will be subject to a 25% loading if the driver is under 25 years of age or if the driver has more than two penalty points endorsed on his licence. Extend the program in question 6 so that, for an eligible applicant, the program will accept as input the basic insurance premium. The program should then display the total premium due.

Objects: age, points, premium

* 1. Get age and points
  2. if underage OR high points
     1. display rejection message

else

1. display acceptance message
2. Get basic premium
3. if under 25 OR more than 2 points
   * + 1. adjust premium by 25%
4. display final premium
5. The following table shows the interest rates for various size loans.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Loan € | Up to 999 | 1000 - 4999 | 5000 - 9999 | 10000 up |
| Rate | 5% | 5.5% | 6.5% | 8% |

Write a program that will accept as input the size of a loan and that will then display the applicable interest rate.

Objects : loan, rate

* 1. Get loan
  2. if else ladder on size of the loan
     1. set rate to appropriate value
  3. display rate

1. Write a program that will accept as input a month number and that will then display the name of the month. e.g. if the user enters 6 then the word June will be displayed.

Object : month

* 1. Get month
  2. switch on month number
     1. display month name as appropriate to case

1. Write a program that will accept as input a month number and that will then display the season. e.g. if the user enters 6 then the word Summer will be displayed.

Object : month

* 1. Get month
  2. switch on month number
     1. display season name as appropriate to group of cases