LAB 5 – SELECTION

Objectives:

At the end of this lab, the students are able to

i. implement selection control using if-else statements
ii. implement selection control using nested if statements
iii. implement selection control using switch

5.1 Activity 1

5.1.1 Objective

Writing pseudocode and Java program implementing selection control using if-else statements.

5.1.2 Problem Description

Write a Java program that receives identity card (IC) number as a twelve digits string from the user. Then, the program should be able to identify birth date in the format DD-MM-YYYY by extracting the first six first digits of the IC number. Here, the program should be able to identify either the birth year is in 19th century (1920-1999) or 20th century (2000-2016). Then, based on the birth date extracted, the program is able to calculate the current age. To solve the problem, you are required to:

i. Design the algorithm in pseudocode.
ii. Write a Java application using JOptionPane class.

[Estimated Time: 30 minutes]

5.2 Activity 2

5.2.1 Objective

Writing pseudocode and Java program implementing selection control using if-else-if statements.

5.2.2 Problem Description

Write a Java program that input value in sales and then calculate the sales commission rate depending on the sales as shown in the table below. To solve the problem, you are required to:

i. Design the algorithm in pseudocode.
ii. Write a Java application using Scanner class.

Sales Commission	Rate
Up to RM 10, 000	10%
RM 10, 000 to RM 15, 000	15%
Over RM 15, 000	20%

[Estimated Time: 30 minutes]

5.3 Activity 3

5.4.1 Objective

Writing pseudocode and Java program implementing selection control using nested if statements.

5.4.2 Problem Description

A bank in your town updates its customers' accounts at the end of each month. The bank offers two types of accounts: savings and checking. Every customer must maintain a minimum balance. If a customer's balance falls below the minimum balance, there is a service charge of RM10.00 for savings accounts and RM25.00 for checking accounts, and is deducted from the balance. If the balance at the end of the month is at least the minimum balance, the account receives interest as follows:

a. Savings accounts receive 4% interest.
b. Checking accounts with balances of up to RM5000 more than the minimum balance receive 3% interest; otherwise, the interest is 5%.

Design a pseudocode and write a Java program that reads a customer's account number (int type), account type (char type; s or S for savings, c or C for checking), minimum balance that the account should maintain, and current balance. The program should then output the account number, account type, current balance, and new balance or an appropriate error message. Test your program by running it five times, using the following data:

46728 S 1000 2700
87324 C 1500 7689
79873 S 1000 800
89832 C 2000 3000
98322 C 1000 750

[Estimated Time: 45 minutes]

5.4 Activity 4

5.5.1 Objective

Writing pseudocode and Java program implementing selection control using if-else and switch statements.

5.5.2 Problem Description

Zeller's congruence is an algorithm developed by Christian Zeller to calculate the day of the week. The formula is:

$$h = \left(q + \left[\frac{13(m+1)}{5}\right] + y + \left[\frac{y}{4}\right] - \left[\frac{y}{100}\right] + \left[\frac{y}{400}\right]\right) \%7$$

where

- *h* is the day of the week (0: Saturday, 1: Sunday, 2: Monday, 3: Tuesday, 4: Wednesday, 5: Thursday, 6: Friday).
- *q* is the day of the month.
- *m* is the month (3: March, 4: April,… 12: December). January and February are counted as months 13 and 14 of the previous year. For example if it is 02-02-2010, the algorithm counts the date as the second day of the fourteenth month of 2009
- *y* is the year
- *k* is the year of the century (i.e., year % 7).

Design a pseudocode and write a Java program using JOptionPane class that prompts the user to enter a date either in the format DD-MM-YYYY or DD/MM/YYYY and displays the name of the day of the week.

[Estimated Time: 45 minutes]

5.5 Activity 5

5.5.1 Objective

Writing pseudocode and Java program implementing selection control using if-else and switch statements.

5.5.2 Problem Description

Pak Ali is a carpenter who creates personalized house signs. He wants an application to compute the price of any sign a customer orders, based on the following factors:

- The minimum charge for all signs is RM30.
- If the sign is made of oak, add RM15. If the sign is made of mahogany, add RM10.
- The first six letters or numbers are included in the minimum charge; there is a RM3 charge for each additional character.
- Black or white characters are included in the minimum charge; there is an additional RM12 charge for gold-leaf lettering.

Design a pseudocode and write a Java program using Scanner class that accepts data for a customer name, wood type, number of characters, and color of characters. Display all the entered data and the final price for the sign.

[Estimated Time: 30 minutes]