

```

        break;
    case 5:
        System.out.println("This is another case 5");
        break;
    default:
        System.out.println("This is the default case");
    }
}
}

```

- **Error to Investigate:** Why does the compiler complain about duplicate case labels? What happens when you have two identical case labels in the same switch block?

Section 2: Java Programming with Conditional Statements

Question 1: Grade Classification

Write a program to classify student grades based on the following criteria:

- If the score is greater than or equal to 90, print "A"
- If the score is between 80 and 89, print "B"
- If the score is between 70 and 79, print "C"
- If the score is between 60 and 69, print "D"
- If the score is less than 60, print "F"

Question 2: Days of the Week

Write a program that uses a nested switch statement to print out the day of the week based on an integer input (1 for Monday, 2 for Tuesday, etc.). Additionally, within each day, print whether it is a weekday or weekend.

Question 3: Calculator

Write a program that acts as a simple calculator. It should accept two numbers and an operator (+, -, *, /) as input. Use a switch statement to perform the appropriate operation. Use nested if-else to check if division by zero is attempted and display an error message.

Question 4: Discount Calculation

Write a program to calculate the discount based on the total purchase amount. Use the following criteria:

- If the total purchase is greater than or equal to Rs.1000, apply a 20% discount.
- If the total purchase is between Rs.500 and Rs.999, apply a 10% discount.
- If the total purchase is less than Rs.500, apply a 5% discount.

Additionally, if the user has a membership card, increase the discount by 5%.

Question 5: Student Pass/Fail Status with Nested Switch

Write a program that determines whether a student passes or fails based on their grades in three subjects. If the student scores more than 40 in all subjects, they pass. If the student fails in one or more subjects, print the number of subjects they failed in.

Section 3: Food for Thought: Research and Read More About

1. Evolution of Programming Languages

- **Research Topic:** Explore the different levels of programming languages: Low-level, High-level, and Assembly-level languages.
 - **Questions to Ponder:**
 - What is a Low-level language? Give examples and explain how they work.
 - What is a High-level language? How does it differ from a low-level language in terms of abstraction and usage?
 - What is an Assembly-level language, and what role does it play in programming?
 - Why do we need different levels of programming languages? What are the trade-offs between simplicity and control over the hardware?

2. Different Programming Languages and Their Usage

- **Research Topic:** Explore different programming languages and understand their use cases.
 - **Questions to Ponder:**
 - What are the strengths and weaknesses of languages like C, Python, Java, JavaScript, C++, Ruby, Go, etc.?
 - In which scenarios would you choose a specific language over others? For example, why would you use JavaScript for web development but Python for data science?
 - Can one programming language be used for all types of software development? Why or why not?

3. Which Programming Language is the Best?

- **Research Topic:** Investigate the debate around the "best" programming language.
 - **Questions to Ponder:**
 - Is there truly a "best" programming language? If so, which one, and why?
 - If a language is considered the best, why aren't all organizations using it? What factors influence the choice of a programming language in an organization (e.g., cost, performance, ecosystem, or community support)?
 - How do trends in programming languages shift over time? What are some emerging languages, and why are they gaining popularity?