

PF - Lab - 05 - Homework - Syed Taimoor Ali - 25K0096

Question 1)

Algorithm:

1. Initialize variable age as an integer.
2. Take age as input from the user.
3. Check Condition 1 IF age is less than 5: Print "Free".
4. Check Condition 2 ELSE IF age is greater than or equal to 65: Print "Discount".
5. ELSE Print "Standard".
6. End of program.

Question2)

Algorithm:

1. Initialize variable powerOn as an integer (1 for On, 0 for Off).
2. Initialize variable lightColor as a character ('R', 'Y', 'G').
3. Take powerOn and lightColor as input.
4. Check Outer Condition (Power): IF powerOn is equal to 1 Check Inner Condition (Color):
5. IF lightColor is 'R' (Red): Print "Stop".
6. ELSE IF lightColor is 'Y' (Yellow): Print "Caution".
7. ELSE IF lightColor is 'G' (Green): Print "Go".
8. ELSE (If power is not 1, meaning it is Off): Print "Signal Off".
9. End of program.

Question3)

Algorithm:

1. Initialize variables a, b, c as floating-point numbers.
2. Initialize variable discriminant as a floating-point number.
3. Take a, b, and c as input.
4. Calculate the discriminant using the formula: $\text{discriminant} = b^2 - 4ac$.
5. Check Condition 1: IF discriminant is greater than 0: Print "Two real roots."
6. Check Condition 2: ELSE IF discriminant is equal to 0: Print "One real root."

7. ELSE (If discriminant is less than 0): Print "Imaginary roots."
8. End of program.

Question4)

Algorithm:

1. Initialize variable correctUsername as a string (Example: "admin").
2. Initialize the variable correctPassword as a string (Example: "P@ss123").
3. Initialize variable inputUsername as a string.
4. Initialize variable inputPassword as a string.
5. Take inputUsername and inputPassword from the user.
6. Check Outer Condition (Username): IF inputUsername is equal to correctUsername:
7. Check Inner Condition (Password): IF inputPassword is equal to correctPassword:
8. Print "Login successful".
9. ELSE (Password is incorrect): Print "Incorrect password".
10. ELSE (Username is incorrect): Print "Username not found".
11. End of program.

Question5)

Algorithm:

1. Initialize variable hasPrerequisite as an integer (1 for Yes, 0 for No).
2. Initialize variable isCourseFull as an integer (1 for Yes, 0 for No).
3. Take hasPrerequisite and isCourseFull as input.
4. Check Success Condition:
5. IF hasPrerequisite is equal to 1 AND isCourseFull is equal to 0:
6. Print "Enrolled successfully".
7. Check Specific Failure 1 (Missing Prerequisite only):
8. ELSE IF hasPrerequisite is equal to 0 AND isCourseFull is equal to 0:
9. Print "Cannot enroll: prerequisite missing".
10. Check Specific Failure 2 (Course Full only):
11. ELSE IF hasPrerequisite is equal to 1 AND isCourseFull is equal to 1:
12. Print "Cannot enroll: course is full".
13. ELSE (If hasPrerequisite is 0 AND isCourseFull is 1):
14. Print "Cannot enroll: prerequisite missing and course is full".

15. End of program.

Question6)

Algorithm:

1. Initialize the variable room as a character ('L' or 'K').
2. Initialize variable action as a character ('L' or 'T').
3. Take room and action as input.
4. Begin Outer Selection (Room):
5. SWITCH on room:
6. CASE 'L' (Living Room):
7. Begin Inner Selection (Action):
8. SWITCH on action:
9. CASE 'L' (Lights):
10. Print "Adjusting ambient lighting."
11. CASE 'T' (Thermostat):
12. Print "Setting living room temperature."
13. END SWITCH (Inner)
14. CASE 'K' (Kitchen):
15. Begin Inner Selection (Action):
16. SWITCH on action:
17. CASE 'L' (Lights):
18. Print "Turning on bright task lighting."
19. CASE 'T' (Thermostat):
20. Print "Setting kitchen temperature."
21. END SWITCH (Inner)
22. DEFAULT (For unknown room):
23. Print "Unknown room command."
24. END SWITCH (Outer)
25. End of program.

Question7)

Algorithm:

1. Initialize variable permissions as an integer.
2. Initialize constants: READ = 1, WRITE = 2, EXECUTE = 4.
3. Take permissions as input.
4. Check Condition 1 (EXECUTE):
5. IF (permissions bitwise AND EXECUTE) is greater than 0:
6. Print "Access granted: full control".
7. Check Condition 2 (READ and WRITE, but NOT EXECUTE):
8. ELSE IF (permissions bitwise AND READ) is greater than 0 AND (permissions bitwise AND WRITE) is greater than 0: Print "Access granted: read and write".
9. Check Condition 3 (READ only):
10. ELSE IF (permissions bitwise AND READ) is greater than 0:
11. Print "Access granted: read-only".
12. ELSE:
13. Print "Access denied".
14. End of program.