Vietnamese-German University

Programming 1 - 61CSE103
Assignment 1
Time: 13h30 – 15h45
Day: October 24, 2024

The lecture notes are allowed during the assignemt. Student needs to comment in detail for all C code.

Question 1: (10 points)

Draw a flowchart that shows the traffic light processing. Then create a C code to implement the algorithm and demostrate your results.

Requirement:

- The light color inputed by user;
- If the color is red, show a message that stop 20 seconds, if the color is yellow, show a message that wait for 5 seconds, else show a message that user can go.

Question 2: (10 points)

Create a flowchart to solve the second order polynomial equation $ax^2 + bx + c = 0$, where the coefficients a, b, c are inputed by user. Only real solutions are considered and the cases with one or two solutions will be seperated. Then, write a C code to implement your results.

Question 3: (10 points)

Create a flowchart to automate a library's book borrowing system. Then create a C code to implement the algorithm and demostrate your results.

Requirement:

- A user requests to borrow a book.
- Check the availability of the book.
- If the book is available, check if the user has any overdue books.
- If no overdue books, allow the borrowing and update the database.
- If the book is unavailable or the user has overdue books, show an announced message to user

Question 4: (10 points)

Design a flowchart for an e-commerce website's checkout process. Then create a C code to implement the algorithm and demostrate your results.

Requirement:

- An order is placed for a product.
- Check if the product is in stock.
- If the product is in stock, update the inventory and generate a shipping order.
- If the product is out of stock, backorder the item and notify the customer.
- Include decision points for canceling the order or changing the order if the product is unavailable.

Question 5: (10 points)

Design a flowchart for an e-commerce website's checkout process. Then create a C code to implement the algorithm and demostrate your results.

Requirement:

- User reviews their shopping cart.
- User chooses a payment method.
- Payment method requires authentication.
- If payment is successful, generate an order confirmation.
- If payment fails, give the user an option to retry.
- Include a decision point for applying a discount code before checkout.

Question 6: (10 points)

Write a C Program to Convert a Given Number of Days in terms of Years, Weeks & Days (assuming that 365 days per year)

Question 7: (10 points)

Write a C Program to create a simple calculator used for performing all the simple arithmetic operations like: Addition, Subtraction, Multiplication, Division, Square roots. The operation should be choosen by user.

Question 8: (15 points)

Write a C program that reads a student grades of Math, Physic and English (in scale 100), then calcualte the GPA by formular: GPA = (Math*2 + Physic + English)/4. The program should print the classification and grade based on the GPA as:

Grade	GPA Score	Classification
A	GPA>=90	Excellent
B	80<= GPA<90	Good
C	70<=GPA<80	Fair
D	60<=GPA<70	Average
F	50<=GPA<60	Weak
Other characters	<50	Fail

At the end, the program should ask the user to continue to read another grade or not. If yes, continues, otherwise, prints “Exit program...”.

Question 9: (15 points)

Write a C program to print a Pascal’s triangle using decision making and looping, where:

- Pascal's Triangle is a triangular array of binomial coefficients.
- The user inputs the number of rows.
- The program generates the triangle using nested loops.
- Each value in Pascal’s Triangle is the sum of the two values directly above it.

$$C(n,k) = \frac{n!}{k!(n-k)!}$$

End