

Programming in C (4331105) - Summer 2023 Solution

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Question 1 [a marks]

3 List any six keywords of C language.

Solution

Table: Six Keywords in C Language

| Keyword | Purpose |
|---------|-----------------------------|
| int | Integer data type |
| float | Floating-point data type |
| if | Conditional statement |
| while | Loop structure |
| return | Returns value from function |
| void | Specifies empty return type |

Mnemonic

"I Feel When Running Very Ill" (int, float, while, return, void, if)

Question 1 [b marks]

4 Define variable. List the rule for naming of variable in c programming.

Solution

Variable: A named memory location used to store data that can be modified during program execution.

Table: Rules for Variable Naming in C

| Rule | Example |
|---|----------------------------|
| Must begin with letter/underscore | name, _value |
| Can contain letters, digits, underscore | user_1, count99 |
| No spaces or special characters | ✓: total_sum, ✗: total-sum |
| Case sensitive | Name ≠ name |
| Cannot use reserved keywords | ✗: int, while |
| Maximum 31 characters (standard) | studentRegistrationNumber |

Mnemonic

"Letters Lead, No Special Keys" (begins with letter, no special chars, no keywords)

Question 1 [c marks]

7 Define flowchart. Draw and Explain flowchart symbols. Write a program to calculate simple interest using below equation. $I=PRN/100$ Where P=Principal amount, R=Rate of interest and N=Period.

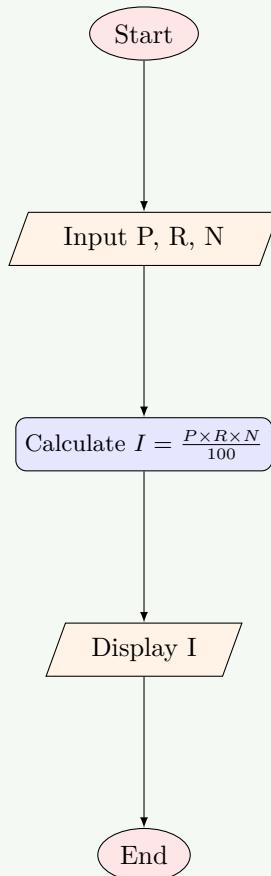
Solution

Flowchart: A graphical representation of an algorithm that uses standard symbols to show the sequence of operations needed to solve a problem.

Table: Flowchart Symbols

| Symbol | Name | Purpose |
|--------------|--------------|-------------------|
| Start/End | Terminal | Start/End |
| Process | Process | Calculations |
| Input/Output | Input/Output | Read/Display data |
| Decision | Decision | Conditions |
| → | Flow Line | Shows sequence |

Simple Interest Flowchart:



Program:

```
1 #include <stdio.h>
```

```

2 void main()
3 {
4     float p, r, n, i;
5
6     printf("Enter principal amount: ");
7     scanf("%f", &p);
8
9     printf("Enter rate of interest: ");
10    scanf("%f", &r);
11
12    printf("Enter time period in years: ");
13    scanf("%f", &n);
14
15    i = (p * r * n) / 100;
16
17    printf("Simple Interest = %.2f", i);
18 }
```

Mnemonic

"Please Return Nice Interest" (Principal, Rate, Number of years, Interest)

Question 1 [c marks]

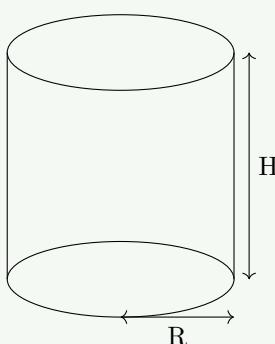
7 OR Define algorithm. Write algorithm for finding volume of cylinder. Write a program to read radius(R) and height(H) from user and print calculated the volume(V) of cylinder using. $V=\pi R^2 H$.

Solution

Algorithm: A step-by-step procedure to solve a problem in a finite amount of time.

Algorithm for Cylinder Volume:

1. Start
2. Input radius (R) and height (H)
3. Calculate volume using formula $V = \pi \times R^2 \times H$
4. Display the volume
5. End

Diagram: Cylinder**Program:**

```

1 #include <stdio.h>
2 void main()
3 {
4     float radius, height, volume;
5     float pi = 3.14159;
```

```

6     printf("Enter radius of cylinder: ");
7     scanf("%f", &radius);
8
9     printf("Enter height of cylinder: ");
10    scanf("%f", &height);
11
12    volume = pi * radius * radius * height;
13
14    printf("Volume of cylinder = %.2f", volume);
15
16 }
```

Mnemonic

"Round Hat Volume" (Radius, Height, Volume)

Question 2 [a marks]

3 List out different operators supported in C programming language.

Solution**Table: Operators in C Programming**

| Operator Type | Examples | Use |
|---------------------|----------------------|-------------------------|
| Arithmetic | +, -, *, /, % | Mathematical operations |
| Relational | <, >, ==, !=, <=, >= | Compare values |
| Logical | &&, , ! | Combine conditions |
| Assignment | =, +=, -=, *=, /= | Assign values |
| Increment/Decrement | ++, - | Increase/decrease by 1 |
| Bitwise | &, , ^, ~, <<, >> | Bit manipulation |
| Conditional | ?: | Short if-else |

Mnemonic

"All Relationships Lead Ancestors Incrementally Beyond Conditions" (first letter of each type)

Question 2 [b marks]

4 Write a program to print sum and average of 1 to 50.

Solution**Program:**

```

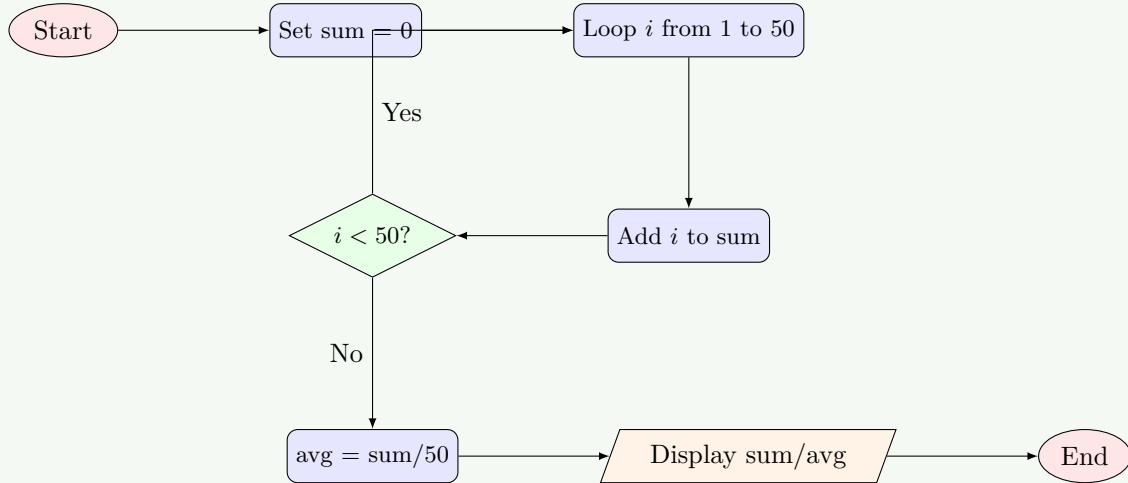
1 #include <stdio.h>
2 void main()
3 {
4     int i, sum = 0;
5     float avg;
6
7     for(i = 1; i <= 50; i++)
8     {
```

```

9         sum = sum + i;
10    }
11
12    avg = (float)sum / 50;
13
14    printf("Sum of numbers from 1 to 50 = %d\n", sum);
15    printf("Average of numbers from 1 to 50 = %.2f", avg);
16
}

```

Process Diagram:



Mnemonic

"Summing And Dividing" (Sum, Average, Division)

Question 2 [c marks]

7 Explain arithmetic & relational operators with example.

Solution

Arithmetic Operators:

Table: Arithmetic Operators in C

| Operator | Operation | Example | Result |
|----------|---------------------|---------|--------|
| + | Addition | 5 + 3 | 8 |
| - | Subtraction | 7 - 2 | 5 |
| * | Multiplication | 4 * 3 | 12 |
| / | Division | 8 / 4 | 2 |
| % | Modulus (Remainder) | 7 % 3 | 1 |

Relational Operators:

Table: Relational Operators in C

| Operator | Meaning | Example | Result |
|----------|--------------------|---------|-----------|
| < | Less than | 5 < 8 | 1 (true) |
| > | Greater than | 9 > 3 | 1 (true) |
| == | Equal to | 4 == 4 | 1 (true) |
| != | Not equal to | 7 != 3 | 1 (true) |
| <= | Less than/equal | 4 <= 4 | 1 (true) |
| >= | Greater than/equal | 6 >= 9 | 0 (false) |

Code Example:

```

1 #include <stdio.h>
2 void main()
3 {
4     int a = 10, b = 5;
5
6     // Arithmetic operators
7     printf("a + b = %d\n", a + b);    // 15
8     printf("a - b = %d\n", a - b);    // 5
9     printf("a * b = %d\n", a * b);    // 50
10    printf("a / b = %d\n", a / b);   // 2
11    printf("a %% b = %d\n", a % b);  // 0
12
13    // Relational operators
14    printf("a < b: %d\n", a < b);    // 0 (false)
15    printf("a > b: %d\n", a > b);    // 1 (true)
16    printf("a == b: %d\n", a == b);  // 0 (false)
17    printf("a != b: %d\n", a != b); // 1 (true)
18 }
```

Mnemonic

"Add Subtract Multiply Divide Remainder" (arithmetic), "Less Greater Equal Not" (relational)

Question 2 [a marks]

3 OR State the difference between gets(S) and scanf("%s",S) where S is string.

Solution

Table: Difference between gets(S) and scanf("%s",S)

| Feature | gets(S) | scanf("%s",S) |
|-------------------|----------------------------------|-----------------------------|
| Space handling | Reads spaces between words | Stops reading at space |
| Input termination | Ends at newline character | Ends at whitespace |
| Buffer overflow | Unsafe, no length check | Safer with width limit |
| Example behavior | "Hello World" → "Hello World" | "Hello World" → "Hello" |
| Security | Deprecated due to overflow risks | Better with width specifier |

Mnemonic

"Gets Spaces, Scanf Stops" (gets reads spaces, scanf stops at spaces)

Question 2 [b marks]

4 OR Write a program to swap two numbers.

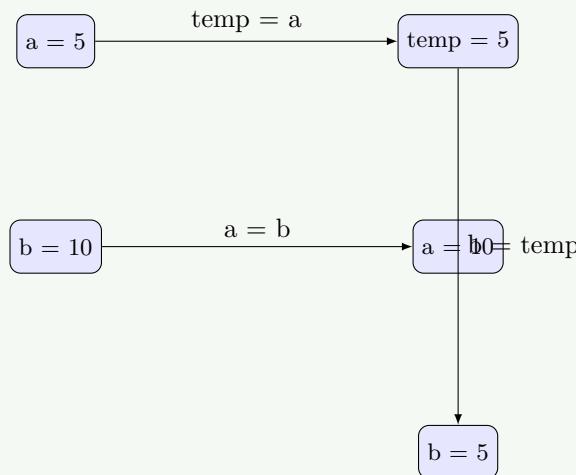
Solution

Program:

```

1 #include <stdio.h>
2 void main()
3 {
4     int a, b, temp;
5
6     printf("Enter value of a: ");
7     scanf("%d", &a);
8
9     printf("Enter value of b: ");
10    scanf("%d", &b);
11
12    printf("Before swapping: a = %d, b = %d\n", a, b);
13
14    // Swapping using temp variable
15    temp = a;
16    a = b;
17    b = temp;
18
19    printf("After swapping: a = %d, b = %d", a, b);
20 }
```

Swapping Diagram:



Mnemonic

”Temporary Assists Swapping” (Temp variable enables swapping)

Question 2 [c marks]

7 OR Explain Logical operator and bit-wise operator with example.

Solution

Logical Operators:

Table: Logical Operators in C

| Operator | Description | Example | Result |
|----------|-------------|----------------|------------------|
| && | Logical AND | (5>3) && (8>6) | 1 (both true) |
| | Logical OR | (5<3) (8>6) | 1 (one true) |
| ! | Logical NOT | !(5>3) | 0 (inverts true) |

Bitwise Operators:

Table: Bitwise Operators in C

| Operator | Description | Example | Binary Result |
|----------|-------------|---------|---------------------|
| & | Bitwise AND | 5 & 3 | 101 & 011 = 001 (1) |
| | Bitwise OR | 5 3 | 101 011 = 111 (7) |
| ^ | Bitwise XOR | 5 ^ 3 | 101 ^ 011 = 110 (6) |
| ~ | Bitwise NOT | ~5 | ~0101 = 1010 (-6) |
| « | Left Shift | 5 « 1 | 101 « 1 = 1010 (10) |
| » | Right Shift | 5 » 1 | 101 » 1 = 10 (2) |

Code Example:

```

1 #include <stdio.h>
2 void main()
3 {
4     int a = 5, b = 3;
5
6     // Logical operators
7     printf("a>3 && b<5: %d\n", (a>3) && (b<5)); // 1 (true)
8     printf("a<3 || b>1: %d\n", (a<3) || (b>1)); // 1 (true)
9     printf("! (a>b): %d\n", !(a>b)); // 0 (false)
10
11    // Bitwise operators
12    printf("a & b: %d\n", a & b); // 1
13    printf("a | b: %d\n", a | b); // 7
14    printf("a ^ b: %d\n", a ^ b); // 6
15    printf("~a: %d\n", ~a); // -6
16    printf("a << 1: %d\n", a << 1); // 10
17    printf("a >> 1: %d\n", a >> 1); // 2
18 }
```

Mnemonic

"AND OR NOT" (logical), "AND OR XOR NOT SHIFT" (bitwise)

Question 3 [a marks]

3 Explain multiple if-else statement with example.

Solution

Multiple if-else: Series of if-else statements where each condition is checked sequentially until a true condition is found.

Structure:

```

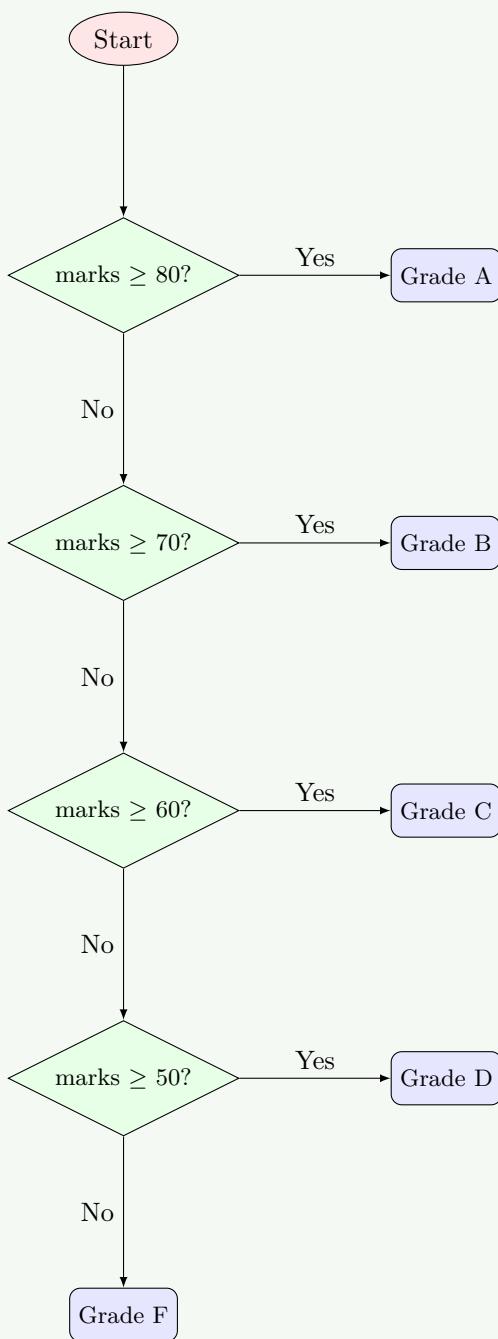
1 if (condition1)
2     statement1;
3 else if (condition2)
```

```
4     statement2;
5 else if (condition3)
6     statement3;
7 else
8     default_statement;
```

Code Example:

```
1 #include <stdio.h>
2 void main()
3 {
4     int marks;
5
6     printf("Enter marks: ");
7     scanf("%d", &marks);
8
9     if (marks >= 80)
10         printf("Grade: A");
11     else if (marks >= 70)
12         printf("Grade: B");
13     else if (marks >= 60)
14         printf("Grade: C");
15     else if (marks >= 50)
16         printf("Grade: D");
17     else
18         printf("Grade: F");
19 }
```

Diagram:

**Mnemonic**

"Check Each Condition in Sequence" (CECS)

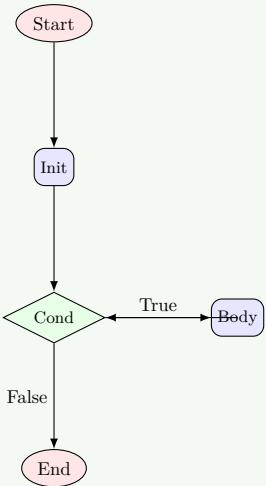
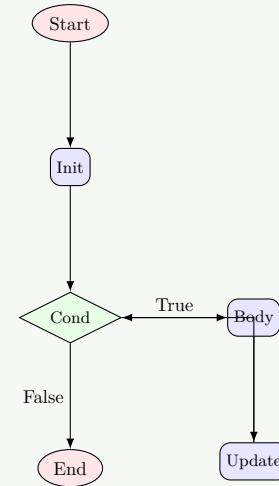
Question 3 [b marks]

4 State the working of while loop and for loop.

Solution

Table: While Loop vs For Loop

| Feature | While Loop | For Loop |
|----------------|------------------------------------|---|
| Syntax | <code>while(cond) { stmt; }</code> | <code>for(init; cond; upd) { stmt; }</code> |
| When to use | Iterations unknown | Iterations known |
| Initialization | Before loop | Inside declaration |
| Update | Inside loop body | In declaration |
| Exit control | Beginning | Beginning |
| Example | User input check | Fixed count |

While Loop Flow:**For Loop Flow:****Mnemonic**

"While Checks Then Acts" (WCTA), "For Initializes Tests Updates" (FITU)

Question 3 [c marks]

7 Write a program to find factorial of a given number.

Solution**Program:**

```

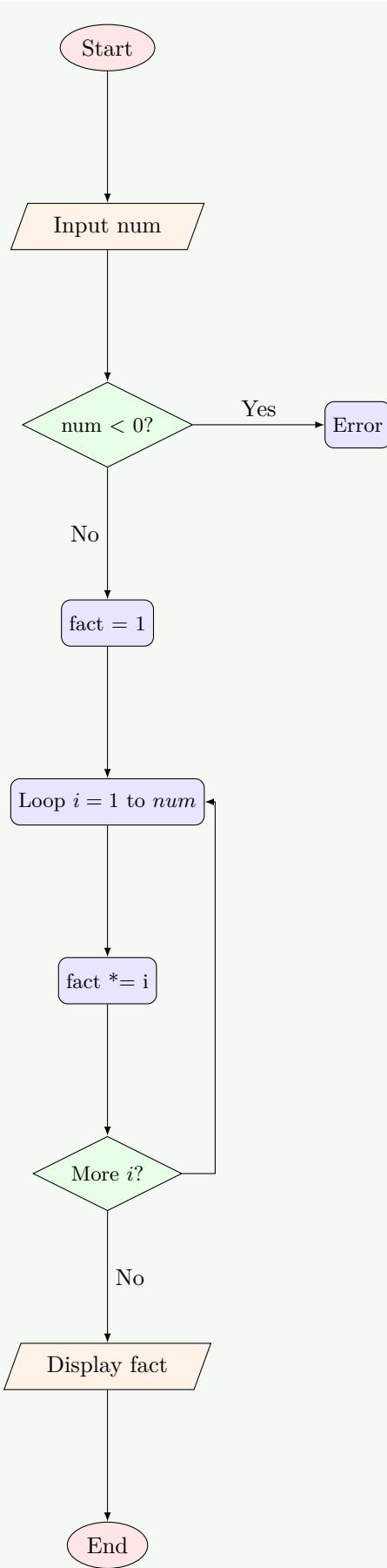
1 #include <stdio.h>
2 void main()
3 {
4     int num, i;
5     unsigned long fact = 1;
6
7     printf("Enter a number: ");
8     scanf("%d", &num);
9
10    if (num < 0)
11        printf("Factorial not defined for negative numbers");
12    else
13    {
14        for(i = 1; i <= num; i++)
15        {
16            fact = fact * i;
17        }
18        printf("Factorial of %d = %lu", num, fact);
19    }
  
```

20 }

Factorial Calculation Table: For example, if num = 5:

| Iter | i | fact * i | New fact |
|------|---|----------|----------|
| Init | - | - | 1 |
| 1 | 1 | 1 * 1 | 1 |
| 2 | 2 | 1 * 2 | 2 |
| 3 | 3 | 2 * 3 | 6 |
| 4 | 4 | 6 * 4 | 24 |
| 5 | 5 | 24 * 5 | 120 |

Factorial Calculation Diagram:



Mnemonic

"Find And Count The Numbers!" (FACTN! - Factorial)

Question 3 [a marks]

3 OR Explain the working of switch-case statement with example.

Solution

Switch-Case: A selection statement that allows a variable to be tested for equality against a list of values (cases).

Structure:

```

1  switch(expression) {
2      case value1:
3          statements1;
4          break;
5      case value2:
6          statements2;
7          break;
8      default:
9          default_statements;
10 }
```

Code Example:

```

1 #include <stdio.h>
2 void main()
3 {
4     int day;
5     printf("Enter day number (1-7): ");
6     scanf("%d", &day);
7
8     switch(day) {
9         case 1: printf("Monday"); break;
10        case 2: printf("Tuesday"); break;
11        case 3: printf("Wednesday"); break;
12        case 4: printf("Thursday"); break;
13        case 5: printf("Friday"); break;
14        case 6: printf("Saturday"); break;
15        case 7: printf("Sunday"); break;
16        default: printf("Invalid day");
17    }
18 }
```

Mnemonic

"Select Value, Exit with Break" (SVEB)

Question 3 [b marks]

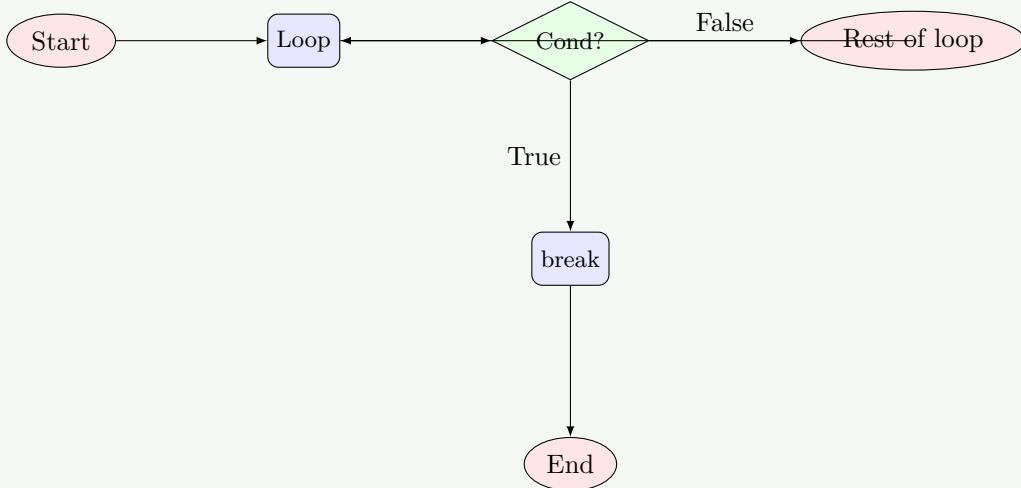
4 OR State the use of break and continue keyword.

Solution

Table: Break vs Continue Keywords

| Feature | break | continue |
|------------|-------------------|-----------------|
| Purpose | Exits loop/switch | Skips iteration |
| Effect | Terminates loop | Next iteration |
| Where used | Loops & switch | Loops only |
| Flow | After loop | Condition check |

Flow Diagram - break:



Mnemonic

"Break Exits, Continue Skips" (BECS)

Question 3 [c marks]

7 OR Write a program to read number of lines (n) from keyboard and print the triangle shown below.

For Example, n=5

Solution

Target Pattern:

```

1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
  
```

Program:

```

1 #include <stdio.h>
2 void main()
3 {
4     int n, i, j;
5
6     printf("Enter number of lines: ");
7     scanf("%d", &n);
8
9     for(i = n; i >= 1; i--)
  
```

```

10    {
11        for(j = 1; j <= i; j++)
12        {
13            printf("%d ", j);
14        }
15        printf("\n");
16    }
17 }
```

Pattern Logic Table: For n = 5:

| i | j range | Output |
|---|---------|-----------|
| 5 | 1 to 5 | 1 2 3 4 5 |
| 4 | 1 to 4 | 1 2 3 4 |
| 3 | 1 to 3 | 1 2 3 |
| 2 | 1 to 2 | 1 2 |
| 1 | 1 to 1 | 1 |

Mnemonic

"Decreasing Rows With Increasing Values" (DRWIV)

Question 4 [a marks]

3 Explain nested if-else statement with example.

Solution

Nested if-else: An if-else statement inside another if or else block.

Structure:

```

1 if (condition1) {
2     if (condition2) {
3         statements1;
4     } else {
5         statements2;
6     }
7 } else {
8     statements3;
9 }
```

Code Example:

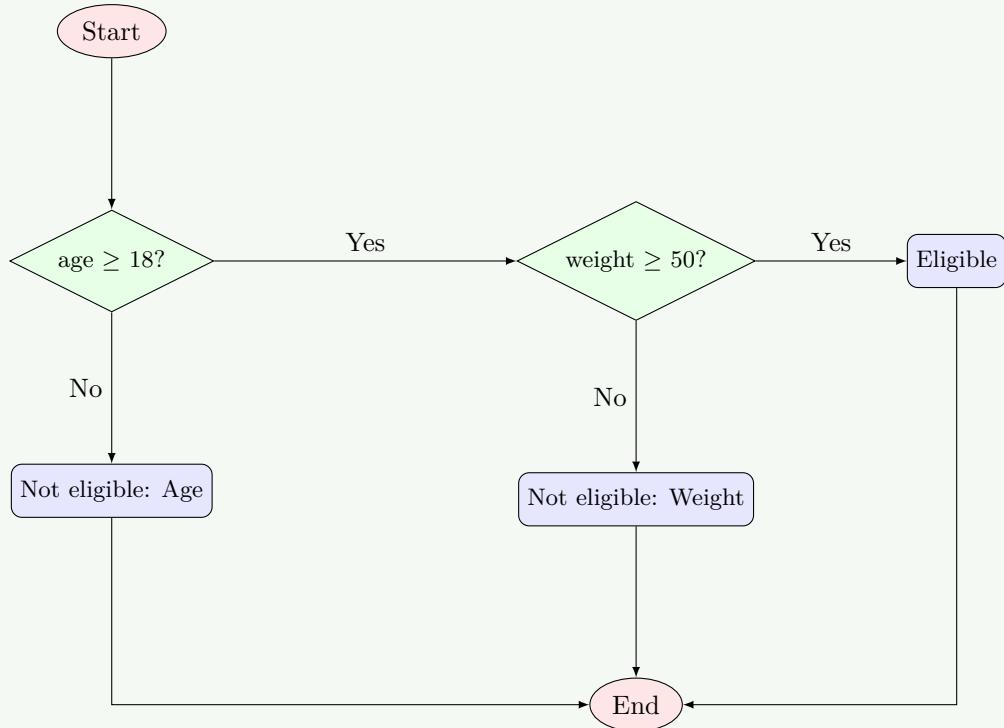
```

1 #include <stdio.h>
2 void main()
3 {
4     int age, weight;
5
6     printf("Enter age: ");
7     scanf("%d", &age);
8
9     if (age >= 18) {
10         printf("Enter weight: ");
11         scanf("%d", &weight);
12
13         if (weight >= 50) {
14             printf("Eligible to donate blood");
15         } else {
16
17     }
```

```

16         printf("Underweight, not eligible");
17     }
18 } else {
19     printf("Age below 18, not eligible");
20 }
21 }
```

Nested if-else Diagram:



Mnemonic

"Check Outside Then Inside" (COTI)

Question 4 [b marks]

4 Write a program to exchange two integer numbers using pointer arguments.

Solution

Program:

```

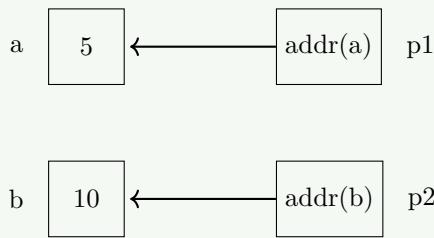
1 #include <stdio.h>
2 void main()
3 {
4     int a, b, temp;
5     int *p1, *p2;
6
7     printf("Enter value of a: ");
8     scanf("%d", &a);
9
10    printf("Enter value of b: ");
11    scanf("%d", &b);
```

```

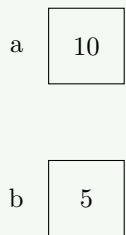
13 p1 = &a; // p1 points to a
14 p2 = &b; // p2 points to b
15
16 printf("Before swapping: a = %d, b = %d\n", a, b);
17
18 // Swapping using pointers
19 temp = *p1;
20 *p1 = *p2;
21 *p2 = temp;
22
23 printf("After swapping: a = %d, b = %d", a, b);
24 }

```

Pointer Swapping Diagram:



After swapping values via pointers:

**Mnemonic**

"Pointers Exchange Memory Values" (PEMV)

Question 4 [c marks]

7 Define Array. Explain initialization & declaration of one-dimensional array.

Solution

Array: A collection of elements of the same data type stored in contiguous memory locations and accessed using indices.

Table: Array Declaration & Initialization

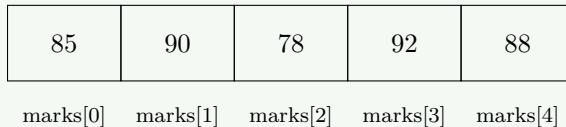
| Operation | Syntax | Example |
|--------------|---------------------------|-------------------------|
| Declaration | type name[size]; | int marks[5]; |
| Init at decl | type name[size] = {vals}; | int nums[4] = {10, 20}; |
| Partial init | type name[size] = {vals}; | int nums[5] = {10}; |
| No size | type name[] = {vals}; | int nums[] = {1, 2}; |
| Individual | name[index] = value; | marks[0] = 95; |

Code Example:

```

1 #include <stdio.h>
2 void main()
3 {
4     // Declaration
5     int marks[5];
6
7     // Initialization after declaration
8     marks[0] = 85; marks[1] = 90;
9     marks[2] = 78; marks[3] = 92; marks[4] = 88;
10
11    // Declaration with initialization
12    int scores[] = {95, 89, 76, 82, 91};
13
14    printf("marks[2] = %d\n", marks[2]);
15 }
```

Memory Representation:



Mnemonic

"Declare, Initialize, Access With Index" (DIAWI)

Question 4 [a marks]

3 OR Explain do while loop with example.

Solution

do-while loop: A loop that executes the body at least once before checking the condition.

Structure:

```

1 do {
2     statements;
3 } while(condition);
```

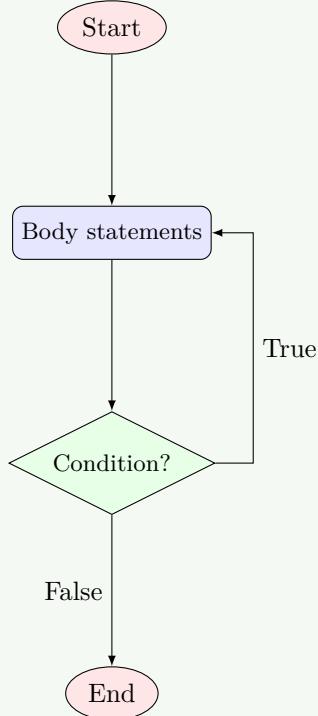
Code Example:

```

1 #include <stdio.h>
2 void main()
3 {
4     int num, sum = 0;
5     do {
6         printf("Enter a number (0 to stop): ");
7         scanf("%d", &num);
```

```

8     sum += num;
9 } while(num != 0);
10 printf("Sum = %d", sum);
11 }
```

do-while Loop Flow:**Key Differences from while loop:**

- Body executes at least once
- Condition checked after execution
- Semicolon required after condition

Mnemonic

"Do First, Check Later" (DFCL)

Question 4 [b marks]

4 OR Explain following functions with example: (1) gets() (2) puts() (3) strlen() (4) strcpy()

Solution**Table: String Functions in C**

| Function | Purpose | Example |
|----------|---------------------------|------------------|
| gets() | Reads string with spaces | gets(name); |
| puts() | Displays string + newline | puts(name); |
| strlen() | Returns string length | n = strlen(str); |
| strcpy() | Copies src to dest | strcpy(d, s); |

Code Example:

```

1 #include <stdio.h>
```

```

2 #include <string.h>
3 void main()
4 {
5     char name[50], copy[50];
6     int length;
7
8     printf("Enter name: ");
9     gets(name);
10    puts(name);
11
12    length = strlen(name);
13    printf("Length: %d\n", length);
14
15    strcpy(copy, name);
16    printf("Copied: %s", copy);
17 }
```

Mnemonic

"Gets Puts String's Length and Copies" (GPSLC)

Question 4 [c marks]

7 OR Define recursion and explain with suitable example. Write a program to find factorial of a given number using recursion.

Solution

Recursion: A process where a function calls itself directly or indirectly until a specific condition is met.

Components:

1. Base case: Condition to stop recursion.
2. Recursive case: Function calling itself.

Code Example:

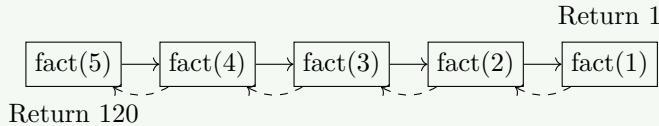
```

1 #include <stdio.h>
2
3 unsigned long factorial(int n)
4 {
5     if (n <= 1)
6         return 1;
7     else
8         return n * factorial(n-1);
9 }
10
11 void main()
12 {
13     int num;
14     printf("Enter a number: ");
15     scanf("%d", &num);
16     printf("Factorial of %d = %lu", num, factorial(num));
17 }
```

Recursion Trace for factorial(5):

| Call | Step | Result |
|---------|---------------------------|---------------------|
| fact(5) | $5 \times \text{fact}(4)$ | $5 \times 24 = 120$ |
| fact(4) | $4 \times \text{fact}(3)$ | $4 \times 6 = 24$ |
| fact(3) | $3 \times \text{fact}(2)$ | $3 \times 2 = 6$ |
| fact(2) | $2 \times \text{fact}(1)$ | $2 \times 1 = 2$ |
| fact(1) | Base case | 1 |

Recursion Diagram:



Mnemonic

"Function Calling Itself, Bottoming Out" (FCIBO)

Question 5 [a marks]

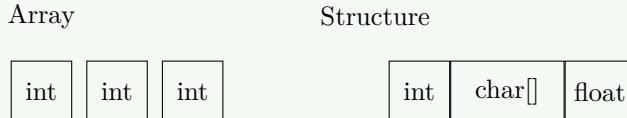
3 Write the difference between array and structure.

Solution

Table: Array vs Structure

| Feature | Array | Structure |
|-----------|-------------------------------|-----------------------------------|
| Data type | Same for all elements | Different types |
| Access | Index (<code>arr[0]</code>) | Member (<code>s.name</code>) |
| Memory | Contiguous | Contiguous (mixed) |
| Size | Fixed | Sum of members |
| Purpose | Collection of similar | Grouping related |
| Decl | <code>int a[5];</code> | <code>struct s { int a; };</code> |

Diagram:



Mnemonic

"Arrays for Same, Structures for Different" (ASSD)

Question 5 [b marks]

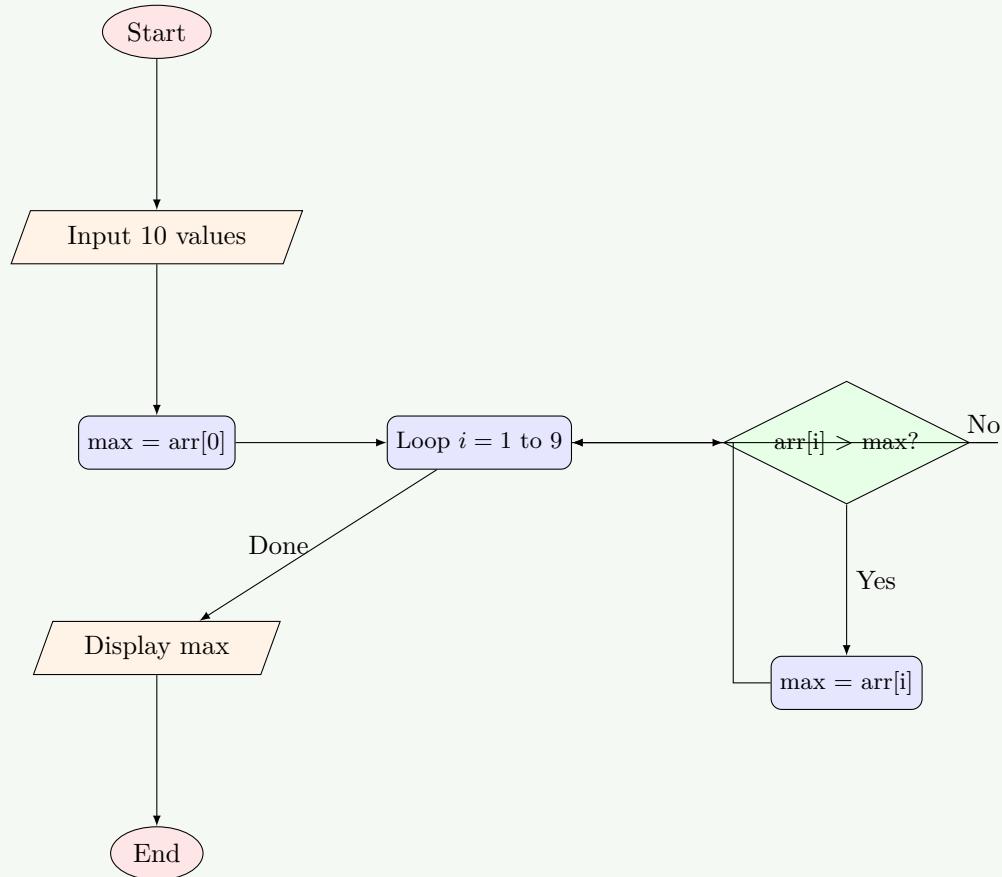
4 Write a C program using array that find the maximum value from given 10 values.

Solution

Program:

```

1 #include <stdio.h>
2 void main()
3 {
4     int arr[10], i, max;
5
6     printf("Enter 10 values:\n");
7     for(i = 0; i < 10; i++) {
8         scanf("%d", &arr[i]);
9     }
10
11    max = arr[0];
12    for(i = 1; i < 10; i++) {
13        if(arr[i] > max)
14            max = arr[i];
15    }
16
17    printf("Maximum value is: %d", max);
18 }
```

Algorithm Flow:**Mnemonic**

"Compare And Replace Maximum" (CARM)

Question 5 [c marks]

7 Define structure? Develop a structure named book to save following information about books. Book

title, Name of author, Price and Number of pages.

Solution

Structure: A user-defined data type that groups related variables of different data types under a single name.

Book Structure Code:

```

1 #include <stdio.h>
2
3 struct book {
4     char title[50];
5     char author[30];
6     float price;
7     int pages;
8 }
9
10 void main()
11 {
12     struct book b1;
13
14     printf("Enter book title: "); gets(b1.title);
15     printf("Enter author name: "); gets(b1.author);
16     printf("Enter price: "); scanf("%f", &b1.price);
17     printf("Enter pages: "); scanf("%d", &b1.pages);
18
19     printf("\nBook Details:\n");
20     printf("Title: %s\n", b1.title);
21     printf("Author: %s\n", b1.author);
22     printf("Price: %.2f\n", b1.price);
23     printf("Pages: %d", b1.pages);
24 }
```

Structure Diagram:

| |
|--------------------|
| struct book |
| title[50] (char) |
| author[30] (char) |
| price (float) |
| pages (int) |

Mnemonic

"Title Author Price Pages" (TAPP)

Question 5 [a marks]

3 OR What is a string? What are the operations that can be performed on string?

Solution

String: A sequence of characters terminated by a null character '\0'.

Table: String Operations in C

| Operation | Function | Example |
|-----------|--------------|---------------|
| Input | gets, scanf | gets(s) |
| Output | puts, printf | puts(s) |
| Length | strlen | l=strlen(s) |
| Copy | strcpy | strcpy(d,s) |
| Concat | strcat | strcat(s1,s2) |
| Compare | strcmp | strcmp(s1,s2) |
| Search | strchr | strchr(s,'a') |

String Representation:



Mnemonic

"Input Output Length Copy Concat Compare Search Convert" (IOLCCSC)

Question 5 [b marks]

4 OR Write a program prints its ASCII value from A to Z.

Solution

Program:

```

1 #include <stdio.h>
2 void main()
3 {
4     char ch;
5
6     printf("ASCII values from A to Z:\n");
7     printf("Char\tValue\n");
8
9     for(ch = 'A'; ch <= 'Z'; ch++)
10    {
11        printf("%c\t%d\n", ch, ch);
12    }
13 }
```

ASCII Representation:



Mnemonic

"Alphabets Sequentially Creating Integer Indices" (ASCII)

Question 5 [c marks]

7 OR What is user defined and library function? Explain with two examples of each.

Solution

Library Functions: Pre-defined functions provided by C language that are ready to use (e.g., printf, sqrt).

User-Defined Functions: Functions created by the programmer to perform specific tasks.

Table: Library vs User-Defined Functions

| Feature | Library Functions | User-Defined Functions |
|------------|--------------------|------------------------|
| Definition | Pre-defined | By programmer |
| Decl | Not needed | Required |
| Header | Required (stdio.h) | Not required |
| Purpose | Common tasks | Custom tasks |

Examples:

1. **Library:** `strlen("Hi")` (string.h), `sqrt(25)` (math.h)

2. **User-Defined:**

```

1 float calculateArea(float l, float w) {
2     return l * w;
3 }
4 int findMax(int a, int b) {
5     return (a>b)?a:b;
6 }
```

Mnemonic

"Libraries Provide, Users Create" (LPUC)