

The solutions to the previous two exams of SP

Summer-25(batch 44)

1.	a)	Interpret the output of the program and explain the change of values in each steps.	[Marks-4]	CLO-1 Level-2
		<pre>#include <stdio.h> int main() { int a=10, b=5,c,d; c = a++; d = --b; b = --c; printf("%d\n", a); printf("%d\n", b); printf("%d\n", c); printf("%d\n", d); return 0; }</pre>		

Output:

11
9
9
4

Explanation:

- I. **a** starts at 10, and after the post-increment (`a++`), it becomes 11.
- II. **b** starts at 5, and after the pre-decrement (`--b`), it becomes 4. Then, after the pre-decrement of **c**, **b** becomes 9.
- III. **c** starts uninitialized, but it gets the value of `a++` (which is 10), and then it is decremented to 9.
- IV. **d** gets the value of `--b` (which is 4).

b)

Rewrite both programs in a correct and compilable form.

i) <pre>#include<stdio.h> Include <math.h> int main () { DOUBLE X; X = 8.5; Y = pow(x); printf("%f %f\n",X,Y); return 0; }</pre>	ii) <pre>#include <stdio.h> #define PI 3.14 int main(){ int length=10, width == 5; float area; area = length x.width; printf("The area of rectangle is: %c\n", area); return 0; }</pre>
---	--

1st problem:

```
#include <stdio.h>

#include <math.h>

int main() {
    double x;
    double y;
    x = 8.5;
    y = pow(x, 2);
    printf("%f %f\n", x, y);
    return 0;
}
```

2nd problem:

```
#include <stdio.h>

#define PI 3.14

int main() {
    int length = 10, width = 5;
    float area;
```

```

area = length * width; // Area calculation for a rectangle (length * width)

printf("The area of the rectangle is: %.2f\n", area);

return 0;

}

```

<p>2.</p> <p>a) Suppose you are a passionate developer and you have told to design a simple restaurant recommendation system that suggests dishes based on the time of day as follows:</p> <ul style="list-style-type: none"> • If the time is between 6 AM and 11 AM - Recommendation is "Pancakes and Coffee" • If the time is between 12 PM and 3 PM - Recommendation is "Chicken Salad" • If the time is between 4 PM and 6 PM - Recommendation is "Samosa and Chai" • If the time is between 7 PM and 10 PM - Recommendation is "Grilled Steak" <p>Solve this logic by writing a program using the C programming language.</p>	<p>[Marks-4]</p> <p>CLO-2 Level-3</p>																
<p>b) Suppose you are tasked to construct a C program that uses a switch-case to calculate the area of a shape based on user choice: 1 = Circle, 2 = Square, 3 = Rectangle. The program should input the required dimensions and display the area. Handle invalid choices properly.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Sample Input</th> <th style="text-align: left; padding: 2px;">Sample Output</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">Enter Choice: 1</td> <td style="padding: 2px;">Area of Circle: 50.265</td> </tr> <tr> <td style="padding: 2px;">Enter Radius: 4</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Enter Choice: 2</td> <td style="padding: 2px;">Area of Square: 16</td> </tr> <tr> <td style="padding: 2px;">Enter One Side: 4</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Enter Choice: 3</td> <td style="padding: 2px;">Area of Rectangle: 12</td> </tr> <tr> <td style="padding: 2px;">Enter Length: 4</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Enter Width: 3</td> <td style="padding: 2px;"></td> </tr> </tbody> </table>	Sample Input	Sample Output	Enter Choice: 1	Area of Circle: 50.265	Enter Radius: 4		Enter Choice: 2	Area of Square: 16	Enter One Side: 4		Enter Choice: 3	Area of Rectangle: 12	Enter Length: 4		Enter Width: 3		<p>[Marks-6]</p> <p>CLO-2 Level-3</p>
Sample Input	Sample Output																
Enter Choice: 1	Area of Circle: 50.265																
Enter Radius: 4																	
Enter Choice: 2	Area of Square: 16																
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Enter Choice: 3	Area of Rectangle: 12																
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<p>c) You're helping a friend build a quirky mobile app called "Number Mirror" that shows how numbers would look if they were reflected in a magical mirror. As the backend developer, your task is to write a program that takes any positive integer as input and reverses its digits using only a loop. This reversed version is what the mirror would display. Construct a C program for the logic of the app.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Sample Input:</th> <th style="text-align: left; padding: 2px;">Sample Output:</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">Enter a number: 7081</td> <td style="padding: 2px;">Mirror image: 1807</td> </tr> </tbody> </table>	Sample Input:	Sample Output:	Enter a number: 7081	Mirror image: 1807	<p>[Marks-5]</p> <p>CLO2 Level-3</p>												
Sample Input:	Sample Output:																
Enter a number: 7081	Mirror image: 1807																

2.a:

```

#include <stdio.h>

int main() {

    int hour;

    printf("Enter the current hour (0-23): ");

    scanf("%d", &hour);

    if (hour >= 6 && hour < 11) {

        printf("Recommendation: Pancakes and Coffee\n");

    } else if (hour >= 12 && hour < 15) {

```

```

printf("Recommendation: Chicken Salad\n");
} else if (hour >= 16 && hour < 18) {
    printf("Recommendation: Samosa and Chai\n");
} else if (hour >= 19 && hour < 22) {
    printf("Recommendation: Grilled Steak\n");
} else {
    printf("No recommendations available at this hour.\n");
}

return 0;
}

```

2.b:-

```

#include <stdio.h>
#include <math.h>

int main() {
    int choice;
    float area;

    printf("Enter Choice: ");
    scanf("%d", &choice);

    switch(choice) {
        case 1: // Circle
        {
            float radius;

```

```

printf("Enter Radius: ");
scanf("%f", &radius);
area = M_PI * radius * radius; // Area of circle = pi * r^2
printf("Area of Circle: %.3f\n", area);
break;
}

case 2: // Square
{
float side;
printf("Enter One Side: ");
scanf("%f", &side);
area = side * side; // Area of square = side^2
printf("Area of Square: %.2f\n", area);
break;
}

case 3: // Rectangle
{
float length, width;
printf("Enter Length: ");
scanf("%f", &length);
printf("Enter Width: ");
scanf("%f", &width);
area = length * width; // Area of rectangle = length * width
printf("Area of Rectangle: %.2f\n", area);
break;
}

default:

```

```

    printf("Invalid choice!\n");

}

return 0;

}

```

2.c:-

```

#include <stdio.h>

int main() {

    int num, reversedNum = 0, remainder;

    printf("Enter a number: ");

    scanf("%d", &num);

    while (num != 0) {

        remainder = num % 10; // Get the last digit

        reversedNum = reversedNum * 10 + remainder; // Build the reversed number

        num /= 10; // Remove the last digit

    }

    printf("Mirror image: %d\n", reversedNum);

    return 0;

}

```

Spring-25(batch 43)

1.	a)	Explain the output of the following expressions.
	(i)	<pre> int x = 5; int y = x++ + 3; printf("%d", y); </pre>
	(ii)	<pre> x = (5 < 8 && 15 > 8) 5 == 5; printf("%d", x); </pre>

Output_(i):-

8

Explanation

Post-increment uses the old value of x before increasing it.

Output_(ii):-

1

Explanation:

1. $5 < 8 \rightarrow \text{true} \rightarrow 1$
2. $15 > 8 \rightarrow \text{true} \rightarrow 1$
 $\rightarrow (5 < 8 \&\& 15 > 8) = 1 \&\& 1 \rightarrow \text{true } (1)$
3. $5 == 5 \rightarrow \text{true } (1)$
4. So the full expression: $(1) || (1) \rightarrow \text{true } (1)$

Therefore, $x = 1$.

b) Observe any errors in the following code and rewrite it with the necessary modifications.

(i)
```c  
#include <stdio.h>  
int main() {  
 int x = 5;  
 float y = 3.14;  
 y = x \* y;  
 printf("Multiplication: %.2f\n", y);  
 return 0;  
}```

(ii)  
```c  
#include <stdio.h>
int main() {
 int a = 3;
 a=-;
 printf("%.2d\n", result);
 return 0;
}```

b-(i):-

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

```
int main() {
```

```

int x = 5;

float y = 3.14;

float result;

result = x * y;

printf("Multiplication: %.2f\n", result);

return 0;

}

```

b-(ii):-

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

```
int main() {
```

```
    int a = 3;
```

```
    int result;
```

```
    result = a - 1;
```

```
    printf("%d\n", result);
```

```
    return 0;
```

```
}
```

| | | | | |
|----|----|--|-----------|------------------|
| 2. | a) | Suppose you are tasked with developing a feedback system for a school based on the student's grades. The system will provide feedback for each grade (A-D) as follows:
A: Excellent work!
B: Good job! | [Marks-5] | CLO-2
Level-3 |
|----|----|--|-----------|------------------|

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| | | | | | | |
|---|--|---------------------|----------------------|---|--|-----------|
| | <p>C: You passed, but there's room for improvement.
D: You need to work harder.</p> <p>Construct a C program based on the above scenario using a switch-case statement.</p> | | | | | |
| b) | <p>One of your friends goes Eid shopping and receives money from his father, mother, and brother. He plans to buy clothes and can choose between cash or mobile banking. If he chooses cash payment, he pays the full amount with no discount. However, if he pays using mobile banking, he gets a 15% discount on his total purchase.</p> <p>Code a C program that takes input for the amount received from the father, mother, and brother, the purchase amount, and the payment method (1 for Mobile Banking, 0 for Cash). The program should calculate and display the total money available, the final amount after applying the discount (if any), and the remaining money after shopping.</p> <table border="1"> <tr> <td>Sample Input</td> <td>Sample Output</td> </tr> <tr> <td>Enter money from father: 2500
Enter money from mother: 1000
Enter money from brother: 500
Enter purchase amount: 3000
Enter payment method: 1 for Mobile Banking, 0 for Cash:</td> <td>Total Money Avail of able:
4000
Final Purchase Amount After 15% Discount: 2550
Remaining Money: 1450</td> </tr> </table> | Sample Input | Sample Output | Enter money from father: 2500
Enter money from mother: 1000
Enter money from brother: 500
Enter purchase amount: 3000
Enter payment method: 1 for Mobile Banking, 0 for Cash: | Total Money Avail of able:
4000
Final Purchase Amount After 15% Discount: 2550
Remaining Money: 1450 | [Marks-5] |
| Sample Input | Sample Output | | | | | |
| Enter money from father: 2500
Enter money from mother: 1000
Enter money from brother: 500
Enter purchase amount: 3000
Enter payment method: 1 for Mobile Banking, 0 for Cash: | Total Money Avail of able:
4000
Final Purchase Amount After 15% Discount: 2550
Remaining Money: 1450 | | | | | |
| c) | <p>A person is planning to go abroad for higher studies and needs to save money for travel expenses. He decides to save a fixed amount every month and wants to track his savings over time. Given the starting balance (initial savings), the monthly savings amount, and the number of months,</p> <table border="1"> <tr> <td>Sample Input</td> <td>Sample Output</td> </tr> <tr> <td>Enter starting balance: 1000
Enter monthly savings amount: 300
Enter the number of months: 4</td> <td>Month 1: Total Savings = 1300
Month 2: Total Savings = 1600
Month 3: Total Savings = 1900
Month 4: Total Savings = 2200</td> </tr> </table> <p>Build a C program to calculate and print the total savings at the end of each month using a for loop.</p> | Sample Input | Sample Output | Enter starting balance: 1000
Enter monthly savings amount: 300
Enter the number of months: 4 | Month 1: Total Savings = 1300
Month 2: Total Savings = 1600
Month 3: Total Savings = 1900
Month 4: Total Savings = 2200 | [Marks-5] |
| Sample Input | Sample Output | | | | | |
| Enter starting balance: 1000
Enter monthly savings amount: 300
Enter the number of months: 4 | Month 1: Total Savings = 1300
Month 2: Total Savings = 1600
Month 3: Total Savings = 1900
Month 4: Total Savings = 2200 | | | | | |

2-(a):-

```
#include <stdio.h>

int main() {
    char grade;
    printf("Enter your grade (A-D): ");
    scanf(" %c", &grade);

    switch (grade) {
        case 'A':
            printf("Excellent work!\n");
            break;
        case 'B':
            printf("Good job!\n");
            break;
        case 'C':
            printf("You passed, but there's room for improvement.\n");
            break;
        case 'D':
            printf("You need to work harder.\n");
            break;
        default:
            printf("Invalid grade entered.\n");
    }
    return 0;
}
```

2-(b):-

```
#include <stdio.h>

int main() {
    int father, mother, brother, purchase, payment;
    float total, finalAmount, remaining;

    printf("Enter money from father: ");
    scanf("%d", &father);

    printf("Enter money from mother: ");
    scanf("%d", &mother);

    printf("Enter money from brother: ");
    scanf("%d", &brother);

    printf("Enter purchase amount: ");
    scanf("%d", &purchase);

    printf("Enter payment method (1 for Mobile Banking, 0 for Cash): ");
    scanf("%d", &payment);

    total = father + mother + brother;
    if (payment == 1)
        finalAmount = purchase * 0.85;
    else
        finalAmount = purchase;
    remaining = total - finalAmount;
```

```
printf("\nTotal Money Available: %.0f", total);
printf("\nFinal Purchase Amount After Discount: %.0f", finalAmount);
printf("\nRemaining Money: %.0f\n", remaining);
return 0;
}
```

2-(c):-

```
#include <stdio.h>

int main() {
    int i, months;
    float savings, monthly;

    printf("Enter starting balance: ");
    scanf("%f", &savings);

    printf("Enter monthly savings amount: ");
    scanf("%f", &monthly);

    printf("Enter number of months: ");
    scanf("%d", &months);

    for (i = 1; i <= months; i++) {
        savings += monthly;
        printf("Month %d: Total Savings = %.0f\n", i, savings);
    }
}
```

```
    return 0;
```

```
}
```