National University of Computer & Emerging Sciences, Karachi
Fall-2022 FAST School of Computing
Midterm-I
26th September 2022, 10:00 am – 11:00am

Course Code:CS1002	**Course Name:** Programming Fundamentals
Instructor Name: Mr. M. Shahzad, Dr. Farooque, Dr. Farrukh Shahid, Dr. M. Usama, Mr. Shahbaz, Mr. Musawar, Ms. Atiya, Ms. Aqsa, Ms. Sumaiyah	
Student Roll No:	**Section:**

Instructions:

- Return the question paper and make sure to keep it inside your answer sheet.
- Read each question completely before answering it. There are **03 questions and 02 pages (front plus back)**.
- In case of any ambiguity, you may make assumption. However, your assumption should not contradict any statement in the question paper.
- Do not write anything on the question paper (except your ID and group).

Total Time: 1 Hour **Max Points**: 64

Question#1a: Fill the blanks **[04 points, CLO1, 07 mins]**

1. When solving problems on the computer, one of the most difficult problem-solving steps for the problem solver / programmer is writing the ……
2. Programmers have two main resources that they need to optimize for cost effectiveness and these resources are …… and ……
3. The compiler generates …… codes.
4. ……. indicates a null statement in 'C' which doesn't do anything on execution.

Question#1b: Correct the errors in the following programs **if there are** and give the output when these programs are executed: **[08 points, CLO1, 12 mins]**

1.
```
int main() {
    int a = 3, b = 5;
    int t = a;
    a = b;
    b = t;
    printf("%d %d", a, b);
    return 0;
}
```

2.
```
#include<stdio.h>
int main()
{
  if((5 && 5) == 5) printf("true");
  else printf("false");
  return 0;
}
```

3.
```
int main()
{
    int m ;

    float n;

    m = 4/11;
    n = 4/11;

    printf("%d\n",m);

    printf("%f\n",n);
return 0;
}
```

4.
```
int main()
{
    float p = 13.25, q = 14.5;

    if (p = q) {
        printf("Think about it!\n");
    }

    return 0;
}
```

Question#2: **[16 points, CLO1, 20 mins]**

Scenario: The FAST ATM machine has biometric security features along with conventional PIN control. If you are Fastian (student or staff), then you have a choice either to use Card + PIN or Card + Biometric option. All outsiders can also withdraw cash from our ATM machine; however, they can only use Card + PIN option. Card is blocked by the machine after three consecutive unsuccessful attempts.

Draw a flowchart and problem analysis chart (PAC) of the above scenario with considering all of the following processes or sub processes at least:

- Reading card
- Separating the process for the outsiders and FASTians
- Finger verification process
- Check balance amount
- Card capturing process

Note: Assume all necessary variables and other steps by yourself.

Question#3: **[32 points, CLO1, 20 mins]**

Write a '*C*' code that calculates a customer's bill for a local cable company. There are two types of customers: residential and business. There are two rates for calculating a cable bill: 1) residential customers and 2) business customers. For residential customers, the following rates apply:

- Bill processing fee: $4.50
- Basic service fee: $20.50
- Premium channels: $7.50 per channel.

For business customers, the following rates apply:

- Bill processing fee: $15.00
- Basic service fee: $75.00 for first 10 connections, $5.00 for each additional connection
- Premium channels: $50.00 per channel for any number of connections

The program should read the customer's account number, customer type (Residential or Business), number of premium channels to which the user subscribes, and number of basic service connections. Assume that R or r stands for a residential customer, and B or b stands for a business customer. Finally, your program will display the Customer's account number and the billing amount.

Sample Input/Output:

Enter account number (an integer): **5106**
Enter customer type: R or r (Residential), B or b (Business): **b**
Enter the number of basic service connections: **16**
Enter the number of premium channels: **8**

Account number: **5106**
Amount due: **$520.00**

BEST OF LUCK!