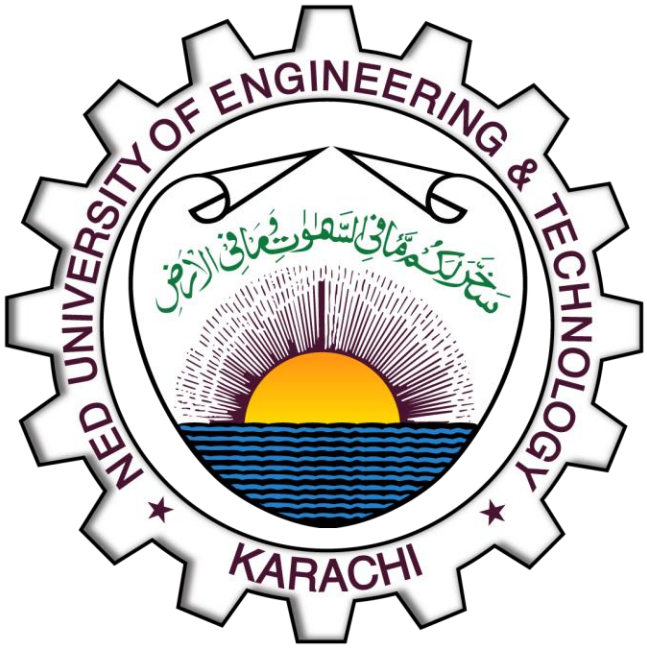
OBJECT ORIENTED PROGRAMMING

[CT-260]



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LAB : 3

QUESTION#1:

CODE:

```
#include <iostream>
using namespace std;

class Cmplx
{
public:
    // variables
    float *real, *img;

    // display functions
    void getComplex()
    {
        cout << "\tComplex Number: " << *real << " + " << *img << "i " << endl;
    }

    // constructors
    Cmplx(float a, float b)
    {
        real = new float(a);
        img = new float(b);
    }

    Cmplx(const Cmplx &obj)
    {
        real = new float(*(obj.real));
        img = new float(*(obj.img));
    }
};

int main()
{
    Cmplx num1(2, 5);
    Cmplx num2 = num1;
    cout << "====Copying the Complex Number====" << endl << endl;
    num1.getComplex();
    num2.getComplex();

    *(num1.real) = 8;
    *(num1.img) = 10;
```

```
    cout << endl << "====Changing the FIRST Complex Number====" << endl << endl;
    num1.getComplex();
    num2.getComplex();

    return 0;
}
```

OUTPUT:

```
====Copying the Complex Number====

        Complex Number: 2 + 5i
        Complex Number: 2 + 5i

====Changing the FIRST Complex Number====

        Complex Number: 8 + 10i
        Complex Number: 2 + 5i
```

QUESTION#2:

CODE:

```
#include <iostream>
using namespace std;

class Character
{
    // member variables
    int *health, *power, *defense;
public:
    // setter methods
    void setHealth(int input)
    {
        *health = input;
    }
    void setPower(int input)
    {
        *power = input;
    }
    void setDefense(int input)
    {
        *defense = input;
    }
    // getter methods
    int getHealth()
    {
        return *health;
    }
    int getPower()
    {
        return *power;
    }
    int getDefense()
    {
        return *defense;
    }
    // Constructors
    Character()
    {
        health = new int(100);
        power = new int(0);
        defense = new int(0);
```

```
    }
    Character(int h, int p, int d)
    {
        health = new int(h);
        power = new int(p);
        defense = new int(d);
    }
    Character(const Character &obj)
    {
        health = new int(*(obj.health));
        power = new int(*(obj.power));
        defense = new int(*(obj.defense));
    }
};

int main()
{
    Character a, b(80, 200, 500);
    Character c = a;

    cout << "Character A:" << endl
         << "Health: " << a.getHealth() << endl
         << "Power: " << a.getPower() << endl
         << "Defense: " << a.getDefense() << endl
         << endl;

    cout << "Character B:" << endl
         << "Health: " << b.getHealth() << endl
         << "Power: " << b.getPower() << endl
         << "Defense: " << b.getDefense() << endl
         << endl;

    cout << "Character C:" << endl
         << "Health: " << c.getHealth() << endl
         << "Power: " << c.getPower() << endl
         << "Defense: " << c.getDefense() << endl;

    return 0;
}
```

OUTPUT:

```
Character A:
Health: 100
Power: 0
Defense: 0

Character B:
Health: 80
Power: 200
Defense: 500

Character C:
Health: 100
Power: 0
Defense: 0
```

QUESTION#3:

CODE:

```
#include <iostream>
using namespace std;

class TollBooth
{
    int totalCars;
    double totalMoney;
public:

    void payingCar(void)
    {
        totalCars++;
        totalMoney += 0.50;
    }
    void displayTollData()
    {
        cout << "Total Cars: " << totalCars << endl
             << "Total Money: $" << totalMoney << endl
             << endl;
    }

    TollBooth() : totalCars(0), totalMoney(0.0) {}
};

int main()
{

    TollBooth hyderabadStation;

    cout << "Morning Shift:-" << endl;
    for (int i = 0; i < 50; i++)
        hyderabadStation.payingCar();
    hyderabadStation.displayTollData();

    cout << "Evening Shift:-" << endl;
    for (int i = 0; i < 100; i++)
        hyderabadStation.payingCar();
    hyderabadStation.displayTollData();

    cout << "Night Shift:-" << endl;
```

```
    for (int i = 0; i < 10; i++)
        hyderabadStation.payingCar();
    hyderabadStation.displayTollData();
    return 0;
}
```

OUTPUT:

```
Morning Shift:-
Total Cars: 50
Total Money: $25

Evening Shift:-
Total Cars: 150
Total Money: $75

Night Shift:-
Total Cars: 160
Total Money: $80
```

QUESTION#4:

CODE:

```
#include <iostream>
using namespace std;

class BookType
{
    string title, author[4], pub;
    int ISBN, noOfCpy, noOfAuth;
    float price;

public:
    // operations on title
    string getTitle()
    {
        return title;
    }
    void setTitle(const string t)
    {
        title = t;
    }
    bool checkTitle(const string t)
    {
        return title == t;
    }
    // operations of number of copies in stock
    int getCopies()
    {
        return noOfCpy;
    }
    void setCopies(const int num)
    {
        noOfCpy = num;
    }
    void updateCopies(const int num)
    {
        noOfCpy += num;
        if (noOfCpy < 0)
            noOfCpy = 0;
    }
```

```
    // operations on authors
    void setAuth(const string auth)
    {
        if (noOfAuth < 4)
            author[noOfAuth++] = auth;
        else
            cout << "Max Limit Reached!!\n";
    }
    void getAuth()
    {
        cout << "No. of authors: " << noOfAuth << endl;
        for (int i = 0; i < noOfAuth; i++)
        {
            cout << "\tAuthor" << i + 1 << ": " << author[i] << endl;
        }
    }
    // operations on Publisher
    string getPub()
    {
        return pub;
    }
    void setPub(const string t)
    {
        pub = t;
    }
    // operations on book price
    float getPrice()
    {
        return price;
    }
    void setPrice(float p)
    {
        price = p;
    }
    // operations on ISBN
    int getISBN()
    {
        return ISBN;
    }
    void setISBN(int i)
    {
        ISBN = i;
    }
```

```
    // constructor
    BookType()
    {
        pub = title = "Unknown";
        for (int i = 0; i < 4; i++)
            author[i] = "N/A";
        ISBN = noOfCpy = noOfAuth = price = 0;
    }
};

void listFeatures(BookType book)
{
    cout << "Title: " << book.getTitle() << endl;
    cout << "Publisher: " << book.getPub() << endl;
    cout << "Price: $" << book.getPrice() << endl;
    cout << "ISBN: " << book.getISBN() << endl;
    book.getAuth();
    int copies = book.getCopies();
    if (copies == 0)
        cout << "\033[1;31mUnavailable.\033[0m" << endl;
    else
        cout << "\033[1;32mIn Stock " << copies << " copies
available.\033[0m" << endl;
}

int main()
{
    BookType books[100];
    cout << "====Welcome to ABC Book Shop!====" << endl;
    int choice, totalBooks = 0;
    do
    {
        cout << "\nSelect options from below:" << endl;
        cout << "1. Add a book" << endl;
        cout << "2. Display all books" << endl;
        cout << "3. Search by Title" << endl;
        cout << "4. Search by ISBN" << endl;
        cout << "5. Search by Publisher" << endl;
        cout << "6. Update number of copies" << endl;
        cout << "7. Exit" << endl;
        cin >> choice;
        cout << endl;
        switch (choice)
```

```
        {
        case 1:
            if (totalBooks < 100)
            {
                string title, author, pub;
                int ISBN, noOfCpy, noOfAuth;
                float price;
                cout << "Enter title of the book: ";
                cin.ignore();
                getline(cin, title);
                books[totalBooks].setTitle(title);
                cout << "Enter number of authors: ";
                cin >> noOfAuth;
                if (noOfAuth > 4)
                    cout << "Only 4 authors allowed at max.\n";
                for (int i = 0; i < noOfAuth && i < 4; i++)
                {
                    cout << "Enter the name of author " << i + 1 << ": ";
                    cin.ignore();
                getline(cin, author);
                    books[totalBooks].setAuth(author);
                }
                cout << "Enter the name of publisher: ";
                cin.ignore();
                getline(cin, pub);
                books[totalBooks].setPub(pub);
                cout << "Enter the ISBN number: ";
                cin >> ISBN;
                books[totalBooks].setISBN(ISBN);
                cout << "Enter the number of copies available in stock: ";
                cin >> noOfCpy;
                books[totalBooks].setCopies(noOfCpy);
                cout << "Enter the price of the book: $";
                cin >> price;
                books[totalBooks].setPrice(price);
                totalBooks++;
            }
            else
                cout << "Max limit of books entered." << endl;
            break;
        case 2:
            cout << "\033[1;33mTotal number of books (" << totalBooks <<
"):\033[0m" << endl;
```

```
            for (int i = 0; i < totalBooks; i++)
            {
                cout << "\033[1;34m=========================\033[0m" <<
endl;
                listFeatures(books[i]);
                cout << "\033[1;34m=========================\033[0m" <<
endl;
            }
            break;
        case 3:
        {
            string title;
            cout << "Enter the title: ";
            cin.ignore();
                getline(cin, title);
            int matches = 0;
            for (int i = 0; i < totalBooks; i++)
                if (books[i].checkTitle(title))
                {
                    matches++;
                    cout << "\033[1;34m=========================\033[0m"
<< endl;
                    listFeatures(books[i]);
                    cout << "\033[1;34m=========================\033[0m"
<< endl;
                }
            cout << "\033[1;33mFound " << matches << " matches.\033[0m" <<
endl;
        }
        break;
        case 4:
        {
            int ISBN;
            cout << "Enter the ISBN: ";
            cin >> ISBN;
            bool found = false;
            for (int i = 0; i < totalBooks; i++)
                if (books[i].getISBN() == ISBN)
                {
                    cout << "\033[1;34m=========================\033[0m"
<< endl;
                    listFeatures(books[i]);
```

```
                    cout << "\033[1;34m=========================\033[0m"
<< endl;
                    found = true;
                    break;
                }
            if (!found)
                cout << "\033[1;31mThe book with ISBN " << ISBN << "
doesn't exists.\033[0m" << endl;
        }
        break;
        case 5:
        {
            string pub;
            cout << "Enter the Publisher: ";
            cin.ignore();
                getline(cin, pub);
            int matches = 0;
            for (int i = 0; i < totalBooks; i++)
                if (books[i].getPub() == pub)
                {
                    matches++;
                    cout << "\033[1;34m=========================\033[0m"
<< endl;
                    listFeatures(books[i]);
                    cout << "\033[1;34m=========================\033[0m"
<< endl;
                }
            cout << "\033[1;33mFound " << matches << " matches.\033[0m" <<
endl;
        }
        break;
        case 6:
        {
            int ISBN, i;
            cout << "Enter the ISBN: ";
            cin >> ISBN;
            bool found = false;
            for (i = 0; i < totalBooks; i++)
                if (books[i].getISBN() == ISBN)
                {
                    cout << "\033[1;34m=========================\033[0m"
<< endl;
                    listFeatures(books[i]);
```

```
                    cout << "\033[1;34m=========================\033[0m"
<< endl;
                    found = true;
                    break;
                }
            if (!found)
                cout << "\033[1;31mThe book with ISBN " << ISBN << "
doesn't exists.\033[0m" << endl;
            else {
                int cpy;
                cout << "Current number of copies: " <<
books[i].getCopies() << endl;
                cout << "Add number of copies: ";
                cin >> cpy;
                books[i].updateCopies(cpy);
            }
        }
        break;
        case 7:
            cout << "Exiting..." << endl;
            break;
        default:
            cout << "\033[1;31mInvalid option\033[0m" << endl;
            break;
        }
    } while (choice != 7);
    return 0;
}
```

OUTPUT:

```
====Welcome to ABC Book Shop!====

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
1
```

```
Enter title of the book: abc
Enter number of authors: 2
Enter the name of author 1: def
Enter the name of author 2: ghi
Enter the name of publisher: klm
Enter the ISBN number: 1234
Enter the number of copies available in stock: 24
Enter the price of the book: $9

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
1

Enter title of the book: lmno
Enter number of authors: 5
Only 4 authors allowed at max.
Enter the name of author 1: ijk
Enter the name of author 2: kji
Enter the name of author 3: opq
Enter the name of author 4: qpo
Enter the name of publisher: ghi
Enter the ISBN number: 5678
Enter the number of copies available in stock: 52
Enter the price of the book: $6

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
2

Total number of books (2):
==========================
Title: abc
Publisher: klm
```

```
Price: $9
ISBN: 1234
No. of authors: 2
        Author1: def
        Author2: ghi
In Stock 24 copies available.
==========================
==========================
Title: lmno
Publisher: ghi
Price: $6
ISBN: 5678
No. of authors: 4
        Author1: ijk
        Author2: kji
        Author3: opq
        Author4: qpo
In Stock 52 copies available.
==========================

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
3

Enter the title: abc
==========================
Title: abc
Publisher: klm
Price: $9
ISBN: 1234
No. of authors: 2
        Author1: def
        Author2: ghi
In Stock 24 copies available.
==========================
Found 1 matches.

Select options from below:
1. Add a book
```

```
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
3

Enter the title: abcd
Found 0 matches.

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
4

Enter the ISBN: 12345
The book with ISBN 12345 doesn't exists.

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
4

Enter the ISBN: 1234
==========================
Title: abc
Publisher: klm
Price: $9
ISBN: 1234
No. of authors: 2
        Author1: def
        Author2: ghi
In Stock 24 copies available.
==========================
```

```
Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
5

Enter the Publisher: klm
=========================
Title: abc
Publisher: klm
Price: $9
ISBN: 1234
No. of authors: 2
        Author1: def
        Author2: ghi
In Stock 24 copies available.
=========================
Found 1 matches.

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
6

Enter the ISBN: 1234
=========================
Title: abc
Publisher: klm
Price: $9
ISBN: 1234
No. of authors: 2
        Author1: def
        Author2: ghi
In Stock 24 copies available.
=========================
```

```
Current number of copies: 24
Add number of copies: 6

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
2

Total number of books (2):
==========================
Title: abc
Publisher: klm
Price: $9
ISBN: 1234
No. of authors: 2
        Author1: def
        Author2: ghi
In Stock 30 copies available.
==========================
==========================
Title: lmno
Publisher: ghi
Price: $6
ISBN: 5678
No. of authors: 4
        Author1: ijk
        Author2: kji
        Author3: opq
        Author4: qpo
In Stock 52 copies available.
==========================

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
```

```
8

Invalid option

Select options from below:
1. Add a book
2. Display all books
3. Search by Title
4. Search by ISBN
5. Search by Publisher
6. Update number of copies
7. Exit
7

Exiting...
```