

UNIVERSITY OF SARGODHA

LAHORE CAMPUS



Final Booklet of Lab Work

Submitted to:

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Semester:

2nd

Section:

A

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BSCS-F17-LC-300

Week 1

1-Program Code:

```
#include<iostream>
using namespace std;
class A{
    private:
        int a;
    public:
        A(){
            a=5;
        }
        friend class oop;
};
class oop{
    public:
        void show(A b)
        {
            cout<<"b="<<b.a;
        }
};
int main(){
    A c;
    oop d;
    d.show(c); }
```

Output:

```
1 #include<iostream>
2 using namespace std;
3 class A{
4     private:
5         int a;
6     public:
7         A(){
8             a=5;
9         }
10        friend class oop;
11 };
12 class oop{
13     public:
14         void show(A b)
15         {
16             cout << " b=" << b.a;
17         }
18 };
19 int main(){
20     A c;
21     oop d;
22     d.show(c); }
23
```

```
b=5
-----
Process exited after 0.04481 seconds with return v
Press any key to continue . . .
```

2-Program:

```

#include<iostream>
using namespace std;
class A{
    private:
        int id,price,i;
    public:
        void input(A Arr[]){
            for(i=0;i<5;i++){
                cout<<"enter id of book";
                cin>>Arr[i].id;
                cout<<"enter the price of book";
                cin>>Arr[i].price;
            }
        }
        void show(A Arr[]){
            int a,max;
            for(i=0;i<5;i++){
                if(Arr[i].price>Arr[0].price){
                    max=Arr[i].price;
                    a=i;
                }
                else{
                    max=Arr[0].price;
                    a=0;
                }
            }
            cout<<"most expensive book has a
price"<<Arr[a].price<<endl<<"and id"<<Arr[a].id;
        }
};
int main(){
    A Arr[5];
    Arr[5].input(Arr);
    Arr[5].show(Arr);
}

```

Output

```

1 #include<iostream>
2 using namespace std;
3 class A{
4     private:
5         int id, price, i;
6     public:
7         void input(A Arr[]){
8             for(i=0; i<5; i++){
9                 cout<<"enter id of book";
10                cin>>Arr[i].id;
11                cout<<"enter the price of book";
12                cin>>Arr[i].price;
13            }
14        }
15        void show(A Arr[]){
16            int a, max;
17            for(i=0; i<5; i++){
18                if(Arr[i].price>Arr[0].price){
19                    max=Arr[i].price;
20                    a=i;
21                }
22                else{
23                    max=Arr[0].price;
24                    a=0;
25                }
26            }
27            cout<<"most expensive book has a price"<<Arr[a].price<<endl<<"and id"<<Arr[a].id;
28        }
29    };
30 int main(){
31     A Arr[5];
32     Arr[5].input(Arr);
33     Arr[5].show(Arr);
34 }

```

C:\Users\Ali\Desktop\Booklet's Questions\W2.exe
 enter the price of book23
 enter id of book123
 enter the price of book23
 enter id of book2
 enter the price of book2
 enter id of book2
 enter the price of book1
 most expensive book has a price2
 and id23

 Process exited after 17.19 seconds with return value 0
 Press any key to continue . . .

Compilation results...
 - Errors: 0
 - Warnings: 0
 - Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\W2.exe
 - Output Size: 1.83349418640137 MiB
 - Compilation Time: 0.92s

Week 2

1-Program:

```

#include<iostream>
using namespace std;
class A{
    private:
        int m=0;
    protected:
        int n=0;
    public:
        int p=0;
        void B()
        {
            m++;
            n++;
            p++;
        }

```

```

};
class oop:public A{
    public:
        void show(){
            cout<<n;
            cout<<p;
        }
};
int main(){
    oop o1;
    o1.show();
    o1.B();
    o1.show();
}

```

Output:

The screenshot shows a C++ IDE with two panes. The left pane displays the source code for 'Weak 2(1).cpp', and the right pane shows the program's output.

Source Code (Weak 2(1).cpp):

```

1  #include<iostream>
2  using namespace std;
3  class A{
4      private:
5          int m=0;
6      protected:
7          int n=0;
8      public:
9          int p=0;
10         void B()
11         {
12             m++;
13             n++;
14             p++;
15         }
16 };
17 class oop:public A{
18     public:
19         void show(){
20             cout<<n;
21             cout<<p;
22         }
23 };
24 int main(){
25     oop o1;
26     o1.show();
27     o1.B();
28     o1.show();
29 }
30

```

Output (C:\Users\Ali\Desktop\Booklet's Questions\Weak 2(1).exe):

```

0011
-----
Process exited after 0.03879 seconds with return value 0
Press any key to continue . . .

```

Message Log:

Warning: non-static data member initializers only available with -std=c++11 or -std=gnu++11

Warning: non-static data member initializers only available with -std=c++11 or -std=gnu++11

Warning: non-static data member initializers only available with -std=c++11 or -std=gnu++11

2-Program:

```
#include<iostream>
using namespace std;
class A{
    private:
        int m=0;
    protected:
        int n=0;
    public:
        int p=0;
        void B()
        {
            m++;
            n++;
            p++;
        }
};

class oop:private A{
    public:
        void show(){
            cout<<n;
            cout<<p;
        }
};

int main(){
    A o1;
    oop o2;
    o2.show();
    o1.B();
    o2.show();
}
```

Output:

The screenshot shows a C++ IDE with a file named `Weak 2(2).cpp` open. The code defines two classes, `A` and `B`, and a `main` function. Class `A` has a `private` member `m`, a `protected` member `n`, and a `public` member `p`. Class `B` inherits from `A` and has a `public` member `display`. The `main` function creates objects `o1` and `o2` of class `B` and calls `show` and `display` methods.

```

1  #include<iostream>
2  using namespace std;
3  class A{
4      private:
5          int m=0;
6      protected:
7          int n=0;
8      public:
9          int p=0;
10         void B()
11     {
12         m++;
13         n++;
14         p++;
15     }
16 };
17 class oop:public A{
18     public:
19         void show(){
20             cout<<n;
21             cout<<p;
22         }
23 };
24 int main(){
25     A o1;
26     oop o2;
27     o2.show();
28     o1.B();
29     o2.show();
30 }
31

```

The output window shows the following text:

```

0000
-----
Process exited after 0.03761 seconds with return value 0
Press any key to continue . . .

```

The IDE also shows a message window with the following text:

```

Message
\\Desktop\Booklet's Questions\Weak 2(2).cpp [Warning] non-static data member initializers only available with -std=c++11 or -std=gnu++11
\\Desktop\Booklet's Questions\Weak 2(2).cpp [Warning] non-static data member initializers only available with -std=c++11 or -std=gnu++11
\\Desktop\Booklet's Questions\Weak 2(2).cpp [Warning] non-static data member initializers only available with -std=c++11 or -std=gnu++11

```

3-Program:

```

#include<iostream>
using namespace std;
class A{
    public:
        void show(){
            cout<<"i love"<<"\t";
        }
};
class B:public A{
    public:
        void display(){
            cout<<"pakistan";
        }
};
int main(){
    B o1;
    o1.show();
    o1.display();
}

```

}

Output:

The screenshot shows a C++ IDE with a code editor and a console window. The code defines two classes, A and B, and a main function. Class A has a show() method that prints "i love". Class B inherits from A and has a display() method that prints "pakistan". The main function creates an object of class B and calls its display() method.

```

1 #include<iostream>
2 using namespace std;
3 class A{
4     public:
5     void show(){
6         cout<<"i love"<<"\t";
7     }
8 };
9 class B:public A{
10    public:
11    void display(){
12        cout<<"pakistan";
13    }
14 };
15 int main(){
16     B o1;
17     o1.show();
18     o1.display();
19 }
20

```

The console window shows the output of the program:

```

i love pakistan
-----
Process exited after 0.03951 seconds with return value 0
Press any key to continue . . .

```

Below the code editor, the compilation results are shown:

```

Compilation results...
-----
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\Weak 2(3).exe
- Output Size: 1.83281230926514 MiB
- Compilation Time: 1.16s

```

4-Program:

```

#include<iostream>
using namespace std;
class A{
    public:
        void show(){
            cout<<"i"<<"\t";
        }
};
class B:public A{
    public:
        void display(){
            cout<<"pakistan";
        }
};
class C:public B{
    public:
        void pro(){
            cout<<"love"<<"\t";
        }
};
int main(){
    C o1;
    o1.show();
    o1.pro();
}

```


o1.display();
}Output:

The screenshot shows a C++ IDE with a file explorer at the top displaying tabs for W1.cpp, W2.cpp, Weak 2(1).cpp, Weak 2(2).cpp, Weak 2(3).cpp, and Weak 2(4).cpp. The main editor shows the code for Weak 2(4).cpp, which defines three classes: A, B, and C. Class A has a show() method that prints 'i'. Class B inherits from A and has a display() method that prints 'pakistan'. Class C inherits from B and has a pro() method that prints 'love'. The main function creates an object of class A and calls show(), pro(), and display() in sequence. A terminal window titled 'Select C:\Users\Ali\Desktop\Booklet's Questions\Weak 2(4).exe' shows the output: 'i love pakistan', followed by a separator line, and then 'Process exited after 0.03864 seconds with return value 0' and 'Press any key to continue . . .'. The bottom status bar shows 'Compilation results...' with 0 errors and 0 warnings, and the output filename is C:\Users\Ali\Desktop\Booklet's Questions\Weak 2(4).exe.

```

1  #include<iostream>
2  using namespace std;
3  class A{
4      public:
5          void show(){
6              cout << "i" << "\t";
7          }
8  };
9  class B:public A{
10     public:
11         void display(){
12             cout << "pakistan";
13         }
14 };
15 class C:public B{
16     public:
17         void pro(){
18             cout << "love" << "\t";
19         }
20 };
21 int main(){
22     C o1;
23     o1.show();
24     o1.pro();
25     o1.display();
26 }

```

Compilation results...

```

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\Weak 2(4).exe
- Output Size: 1.83299732208252 MiB
- Compilation Time: 1.09s

```

5-Program:

```

#include<iostream>
using namespace std;
class A{
    public:
        void show(){
            cout<<"is great"<<"\t";
        }
};
class B:public A{
    public:
        void display(){
            cout<<"pakistan ";//"\t";
        }
};
class C:public A{
    public:
        void pro(){
            cout<<"love ";//<<"\t";
        }
};
int main(){
    C o1;
    B o2;
    o1.pro();
    o1.show();
    o2.display();

```

```
o2.show();
```

```
}
```

Output:

The screenshot shows a C++ IDE with a code editor on the left and an output window on the right. The code editor displays a C++ program with three classes: A, B, and C. Class A has a show() method. Class B inherits from A and has a display() method. Class C inherits from A and has a pro() method. The main function creates objects o1 and o2, calls o1.pro(), o1.show(), o2.display(), and o2.show(). The output window shows the execution results: 'love is great pakistan is great', followed by a separator line, 'Process exited after 0.03892 seconds with return value 0', and 'Press any key to continue . . .'. Below the code editor, a 'Compilation results...' window shows 'Errors: 0', 'Warnings: 0', and other compilation details.

```
1 #include<iostream>
2 using namespace std;
3 class A{
4     public:
5     void show(){
6         cout<<"is great"<<"\t";
7     }
8 };
9 class B:public A{
10     public:
11     void display(){
12         cout<<"pakistan ";//"\t";
13     }
14 };
15 class C:public A{
16     public:
17     void pro(){
18         cout<<"love ";//<<"\t";
19     }
20 };
21 int main(){
22     C o1;
23     B o2;
24     o1.pro();
25     o1.show();
26     o2.display();
27     o2.show();}
```

Output:

```
love is great pakistan is great
-----
Process exited after 0.03892 seconds with return value 0
Press any key to continue . . .
```

Compilation results...

```
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\Weak 2(5).exe
- Output Size: 1.83299732208252 MiB
- Compilation Time: 1.17s
```

6-Program:

```
#include<iostream>
```

```
using namespace std;
```

```
class A{
```

```
    public:
```

```
        void show(){
```

```
            cout<<"i"<<"\t";        };
```

```
class B:virtual public A{
```

```
    public:
```

```
        void display(){
```

```
            cout<<"Programming"<<"\t";        };
```

```
class C:virtual public A{
```

```
    public:
```

```
        void pro(){
```

```
            cout<<"love"<<"\t";};
```

```
class D:public C,public B{
```

```
    public:
```

```
        void meh(){
```

```
            cout<<"A"<<"\t";};
```

```
int main(){
```

```

D o1;
o1.meh();
o1.show();
o1.pro();
o1.display();

```

Output:

The screenshot shows a C++ IDE with a code editor on the left and a console window on the right. The code editor contains the following code:

```

1 #include<iostream>
2 using namespace std;
3 class A{
4     public:
5     void show(){
6         cout << "i" << "\t";
7     }
8 };
9 class B:virtual public A{
10    public:
11    void display(){
12        cout << "Programmi ng" << "\t ";
13    }
14 };
15 class C:virtual public A{
16    public:
17    void pro(){
18        cout << "love" << "\t ";
19    }
20 };
21 class D:public C, public B{
22    public:
23    void meh(){
24        cout << "A" << "\t ";
25    }
26 };
27 int main(){
28     D o1;
29     o1.meh();
30     o1.show();
31     o1.pro();
32     o1.display();

```

The console window shows the output of the program:

```

A      i      love      Programming
-----
Process exited after 0.03881 seconds with return value 0
Press any key to continue . . .

```

Below the console window, the compilation results are shown:

```

Compilation results...
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\Weak 2(6).exe
- Output Size: 1.83518695831299 MiB
- Compilation Time: 0.94s

```

Week 3

1-Program:

```

#include<iostream>
using namespace std;
class A{
    protected:
        int a;
    public:
        A(){
            a=10;
        };
class B:public A{
    private:
        int b;
    public:
        B():A(){
            b=20;
        }

```

```

void show(){
    cout<<"a="<<a<<endl;
    cout<<"b="<<b<<endl;    };

int main(){
    B o1;
    o1.show();    }

```

Output:

The screenshot shows a C++ IDE with a code editor and a console window. The code editor contains the following code:

```

1 #include<iostream>
2 using namespace std;
3 class A{
4     protected:
5         int a;
6     public:
7         A() {
8             a=10; }
9     class B:public A{
10        private:
11            int b;
12        public:
13            B():A() {
14                b=20;
15            }
16            void show() {
17                cout<<"a="<<a<<endl;
18                cout<<"b="<<b<<endl; }
19
20 int main() {
21     B o1;
22     o1.show(); }

```

The console window shows the output of the program:

```

a=10
b=20

-----
Process exited after 0.03922 seconds with return value 0
Press any key to continue . . .

```

Below the console window, the compilation results are shown:

```

Compilation results...
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\Weak 3(1).exe
- Output Size: 1.83266448974609 MiB
- Compilation Time: 0.92s

```

2-Program:

```

#include<iostream>
using namespace std;
class A{
    protected:
        int a;
    public:
        A(){
            a=10; }
        A(int x){
            a=x; };

class B:public A{
    private:
        char b;
    public:
        B():A(){
            b='t'; }
        B(char y,int m):A(m){
            b=y;}
        void show(){
            cout<<"a="<<a<<endl;
            cout<<"b="<<b<<endl;}};

```

```
int main(){
    B o1('u',10);
    o1.show();    }
```

Output:

The screenshot shows a C++ IDE with a code editor and a console window. The code editor contains the following code:

```
1 #include<iostream>
2 using namespace std;
3 class A{
4     protected:
5         int a;
6     public:
7         A(){
8             a=10;    }
9         A(int x){
10            a=x;    };
11 class B:public A{
12     private:
13         char b;
14     public:
15         B():A(){
16             b='t';    }
17         B(char y,int m):A(m){
18             b=y;    }
19         void show(){
20             cout<<"a="<<a<<endl;
21             cout<<"b="<<b<<endl;    };
22 int main(){
23     B o1('u',10);
24     o1.show();    }
```

The console window shows the output of the program:

```
a=10
b=u
-----
Process exited after 0.03961 seconds with return value 0
Press any key to continue . . .
```

Below the code editor, the compilation results are shown:

```
Compilation results...
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\Weak 3(2).exe
- Output Size: 1.83266830444336 MiB
- Compilation Time: 0.94s
```

3-Program:

```
#include<iostream>
using namespace std;
class Parent{
    private:
        int n=10;
    public:
        void show(){
            cout<<"n="<<n<<endl;    };
class child:public Parent{
    private:
        int b=15;
    public:
        void show(){
            Parent::show();
            cout<<"b="<<b;    };
int main(){
    child o1;
```

o1.show(); }

Output:

The screenshot shows a C++ IDE with a code editor on the left and a console window on the right. The code editor contains the following code:

```

1 #include<iostream>
2 using namespace std;
3 class Parent{
4     private:
5         int n=10;
6     public:
7         void show(){
8             cout <<"n=" <<n<<endl ;}};
9 class child:public Parent{
10     private:
11         int b=15;
12     public:
13         void show(){
14             Parent::show();
15             cout <<"b=" <<b;}};
16 int main(){
17     child o1;
18     o1.show(); }
19

```

The console window on the right shows the output of the program:

```

n=10
b=15
-----
Process exited after 0.03493 seconds with re
Press any key to continue . . .

```

Below the code editor, there is a message window showing two warnings:

```

Message
\\Desktop\Booklet's Questions\Weak 3(3).cpp [Warning] non-static data member initializers only available with -std=c++11 or -std=gnu++11
\\Desktop\Booklet's Questions\Weak 3(3).cpp [Warning] non-static data member initializers only available with -std=c++11 or -std=gnu++11

```

At the bottom of the IDE, there is a status bar showing:

```

Sel: 0 Line: 19 Length: 304 Insert Done parsing in 0 seconds

```

4-Program:

```

#include<iostream>
using namespace std;
class Parent{
    private:
        int n=10;
    public:
        void show(){
            cout<<"n="<<n<<endl;    };
class child:public Parent{
    private:
        int b=15;
    public:
        void show(){

```

```

        Parent::show();
        cout<<"b="<<b<<endl;    });

class child1:public child{
    private:
        int c=20;
    public:
        void show(){
            child::show();
            cout<<"c="<<c;    });

int main(){
    child1 o1;
    o1.show(); }

```

Output:

The screenshot shows a C++ IDE with a code editor on the left and a console window on the right. The code editor displays the following code:

```

1 #include<iostream>
2 using namespace std;
3 class Parent{
4     private:
5         int n=10;
6     public:
7         void show(){
8             cout <<" n=" <<n<<endl;};
9 class child: public Parent{
10     private:
11         int b=15;
12     public:
13         void show(){
14             Parent::show();
15             cout <<" b=" <<b<<endl;};
16 class child1: public child{
17     private:
18         int c=20;
19     public:
20         void show(){
21             child::show();
22             cout <<" c=" <<c;    });
23 int main(){
24     child1 o1;
25     o1.show(); }

```

The console window on the right shows the output of the program:

```

b=15
c=20
-----
Process exited after 0.03503 seconds with return
Press any key to continue . . .

```

At the bottom of the IDE, there is a message box with the following text:

```

Message
[Warning] non-static data member initializers only available with -std=c++11 or -std=gnu++11
[Warning] non-static data member initializers only available with -std=c++11 or -std=gnu++11
[Warning] non-static data member initializers only available with -std=c++11 or -std=gnu++11

```

5-Program:

```

#include<iostream>
using namespace std;
class A{
    public:
        virtual void disp()=0;};

class B:public A{
    int b;
    public:
        B(int x){

```

```

        b=x;}
        void disp()
        {cout<<"Class B and b"<<b;}}};

class C:public A{
    int c;
    public:
        C (int x){
            c=x;}
        void disp(){cout<<"Class C and c="<<c;}};

int main(){
    A *p;
    B o1(10);
    C o2(20);
    p=&o1;
    p->disp();
    p=&o2;
    p->disp(); }

```

Output:

```

1 #include<iostream>
2 using namespace std;
3 class A{
4     public:
5         virtual void disp()=0; };
6 class B: public A{
7     int b;
8     public:
9         B(int x){
10             b=x; }
11         void disp()
12         {cout<<"Class B and b"<<b;}}};
13 class C: public A{
14     int c;
15     public:
16         C (int x){
17             c=x; }
18         void disp(){cout<<"Class C and c="<<c;}};
19 int main(){
20     A *p;
21     B o1(10);
22     C o2(20);
23     p=&o1;
24     p->disp();
25     p=&o2;

```

Output:

```

Class B and b10Class C and c=20
-----
Process exited after 0.04747 seconds with return value 0
Press any key to continue . . .

```

Compilation results...

```

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\Weak 3(5).exe
- Output Size: 1.83440494537354 MiB
- Compilation Time: 0.94s

```

6-Program:

```

#include<iostream>
using namespace std;
class A{
    private:

```



```

int a;
public:
    A(int z){a=z;}
    void show(){
        cout<<a<<endl;}};

class B:public A{
private:
    int b;
public:
    B(int x , int m):A(m){b=x;}
    void show(){
        A::show();cout<<b<<endl;}};

class C:public B{
private:
    int c;
public:
    C(int y,int f , int h):B(f,h){c=y;}
    void show(){B::show();cout<<c;}};

int main(){
    C ob(12,23,34);
    ob.show();}

```

Output:

The screenshot shows a C++ IDE with the following code in the editor:

```

1  #include<iostream>
2  using namespace std;
3  class A{
4      private:
5          int a;
6      public:
7          A(int z){a=z;}
8          void show(){
9              cout<<a<<endl;}};
10 class B:public A{
11     private:
12         int b;
13     public:
14         B(int x , int m):A(m){b=x;}
15         void show(){
16             A::show();cout<<b<<endl;}};
17 class C:public B{
18     private:
19         int c;
20     public:
21         C(int y,int f , int h):B(f,h){c=y;}
22         void show(){B::show();cout<<c;}};
23 int main(){
24     C ob(12,23,34);
25     ob.show();}

```

The output window shows the following output:

```

23
12
-----
Process exited after 0.0391 seconds with return value 0
Press any key to continue . . .

```

The compilation results window shows the following information:

```

Compilation results...
-----
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\Desktop\Booklet's Questions\Weak 3(6).exe
- Output Size: 1.83368492126465 MiB
- Compilation Time: 1.23s

```

7-Program:

```
#include<iostream>
using namespace std;
class Base{
protected:
int a;
public:
Base(){a=10;}};
class Derived:public Base{
int b;
public:
Derived(){b=20;}
void show(){
cout<<a<<endl<<b<<endl;}};
int main(){Derived a1;a1.show();system("pause>0");}
```

Output:

```
1 #include<iostream>
2 using namespace std;
3 class Base{
4 protected:
5 int a;
6 public:
7 Base() {a=10;}};
8 class Derived:public Base{
9 int b;
10 public:
11 Derived() {b=20;}
12 void show() {
13 cout <<a<<endl <<b<<endl;}};
14 int main() {Derived a1;a1.show();system("pause>0");}
```

Output:

```
10
20
-----
Process exited after 43.39 seconds with return code 0
Press any key to continue . . .
```

Compilation results...

```
- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\Ali\AppData\Local\Temp\Rar$DIa5468.12385\constructor in inheritance (default.exe)
- Output Size: 1.83292770385742 MiB
- Compilation Time: 0.95s
```