EUROPEAN UNIVERSITY OF LEFKE
Faculty of Engineering
Department of Computer Engineering

COMP218
OBJECT-ORIENTED PROGRAMMING

Lab Work No. 3

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Task (1)

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

template<class T>
T distance( T x1, T x2, T y1, T y2 )
{
    T d;
    d = sqrt( pow( ( y2 - y1 ), 2 ) + pow( ( x2 - x1 ), 2 ) );
    return d;
}

int main()
{
    int a1, a2, b1, b2;
    double c1, c2, d1, d2;

    cout << "----------------------------------------" << endl;
    cout << "DISTANCE CALCULATOR WITH INTEGER VALUES" << endl;
    cout << "----------------------------------------" << endl;
    cout << "FIRST POINT:" << endl;
    cout << "X-Cordinate = ";
    cin >> a1;
    cout << "Y-Cordinate = ";
    cin >> b1;
    cout << endl;

    cout << "SECOND POINT:" << endl;
    cout << "X-Cordinate = ";
    cin >> a2;
    cout << "Y-Cordinate = ";
    cin >> b2;
    cout << endl;

    cout << "Distance = " << distance( a1, a2, b1, b2) << endl;

    cout << "----------------------------------------" << endl;
    cout << "DISTANCE CALCULATOR WITH DOUBLE VALUES" << endl;
    cout << "----------------------------------------" << endl;
    cout << "FIRST POINT:" << endl;
    cout << "X-Cordinate = ";
    cin >> c1;
    cout << "Y-Cordinate = ";
    cin >> d1;
    cout << endl;

    cout << "SECOND POINT:" << endl;
    cout << "X-Cordinate = ";
    cin >> c2;
    cout << "Y-Cordinate = ";
    cin >> d2;
    cout << endl;

    cout << "Distance = " << distance( c1, d2, c1, d2);
    return 0;
}
```

```
----------------------------------------
DISTANCE CALCULATOR WITH INTEGER VALUES
----------------------------------------
FIRST POINT:
X-Cordinate = 8
Y-Cordinate = 6

SECOND POINT:
X-Cordinate = 16
Y-Cordinate = 21

Distance = 17
----------------------------------------
DISTANCE CALCULATOR WITH DOUBLE VALUES
----------------------------------------
FIRST POINT:
X-Cordinate = 58.9
Y-Cordinate = 25.97

SECOND POINT:
X-Cordinate = 21.4
Y-Cordinate = 78.5

Distance = 27.7186
```

Task (2)

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

int volume( int a = 1, int b = 1, int c = 1 );

int main()
{
    cout << "-------------------------------------------" << endl;
    cout << "VOLUME CALCULATOR WITH DEFAULT ARGUMENTS" << endl;
    cout << "-------------------------------------------" << endl;
    cout << "Results with different function calls:" << endl;
    cout << volume() << endl;
    cout << volume(2) << endl;
    cout << volume(2, 3) << endl;
    cout << volume(2, 3, 4) << endl;

    return 0;
}

int volume( int a, int b, int c )
{
    return ( a * b * c );
}
```

```
-------------------------------------------
VOLUME CALCULATOR WITH DEFAULT ARGUMENTS
-------------------------------------------
Results with different function calls:
1
2
6
24
```

Task (3)

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

void swapCPP( char &a, char &b)
{
    char temp = a;
    a = b;
    b = temp;
}

void swapC( char *a, char *b)
{
    char temp = *a;
    *a = *b;
    *b = temp;
}

int main()
{
    char a = 'A', b = 'B';
    char x = 'X', y = 'Y';

    cout << "-----------------------------------------------------" << endl;
    cout << "PROGRAM TO SWAP 2 CHARACTERS PASSED BY REFERENCE" << endl;
    cout << "-----------------------------------------------------" << endl;

    cout << "TEST 1" << endl;
    cout << "-------" << endl;
    cout << "BEFORE SWAP: " << a << "    " << b << endl;
    swapCPP(a, b);
    cout << "AFTER SWAP: " << a << "    " << b << endl;
    cout << endl;

    cout << "TEST 2" << endl;
    cout << "-------" << endl;
    cout << "BEFORE SWAP: " << x << "    " << y << endl;
    swapCPP(x, y);
    cout << "AFTER SWAP: " << x << "    " << y << endl;
    cout << endl;

    cout << "-----------------------------------------------------" << endl;
    cout << "VERSION USING C-STYLE CALL-BY-REFERENCE METHODOLOGY" << endl;
    cout << "-----------------------------------------------------" << endl;

    cout << "BEFORE SWAP: " << a << "    " << b << endl;
    swapC(&a, &b);
    cout << "AFTER SWAP: " << a << "    " << b << endl;
    cout << endl;

    return 0;
}
```

```
------------------------------------------------
PROGRAM TO SWAP 2 CHARACTERS PASSED BY REFERENCE
------------------------------------------------
TEST 1
-------
BEFORE SWAP: A    B
AFTER SWAP: B    A

TEST 2
-------
BEFORE SWAP: X    Y
AFTER SWAP: Y    X


------------------------------------------------------
VERSION USING C-STYLE CALL-BY-REFERENCE METHODOLOGY
------------------------------------------------------
BEFORE SWAP: B    A
AFTER SWAP: A    B
```

Task (4)

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

inline double area( double r )
{
    return ( M_PI* pow(r, 2) );
}

inline double volume( double r, double h )
{
    return ( area(r) * h );
}
int main()
{
    double radius, height;

    cout << "--------------------------------------------------------" << endl;
    cout << "PROGRAM TO CALCULATE AREA OF CIRCLE & VOLUME OF CYLINDER" << endl;
    cout << "--------------------------------------------------------" << endl;
    cout << "Enter the radius: ";
    cin >> radius;
    cout << "Enter the height: ";
    cin >> height;

    cout << "--------------------------------------------------------" << endl;
    cout << "AREA = " << area(radius) << endl;
    cout << "VOLUME = " << volume(radius, height) << endl;
    cout << "--------------------------------------------------------" << endl;

    return 0;
}
```

```
----------------------------------------------------------
PROGRAM TO CALCULATE AREA OF CIRCLE & VOLUME OF CYLINDER
----------------------------------------------------------
Enter the radius: 5
Enter the height: 12
----------------------------------------------------------
AREA = 78.5398
VOLUME = 942.478
----------------------------------------------------------
```