1- Write a program and define a pair and print its elements.

اكتب برنامجًا وحدد زوجًا واطبع عناصره.

Output

```
Gammal Tech
123456789
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<string>
#include<utility>

using namespace std;

int main() {
    pair<string, int> x;
    x.first = "Gammal Tech";
    x.second = 123456789;

    cout << x.first << endl;
    cout << x.second << endl;

    return 0;
}
```

2- Write a program and Use an array of pairs to store names and numbers

اكتب برنامجا واستخدم array من الأزواج لتخزين الاسماء والأرقام

Input

```
Enter name: nameOne
Enter number: 0121212121
Enter name: nameTwo
Enter number: 131313113
Enter name: nameThree
Enter number: 141414141
```

Output

```
1) nameOne   121212121
2) nameTwo   131313113
3) nameThree   141414141
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<string>
#include<utility>

using namespace std;

int main() {
    pair<string, int> x[3];

    for(int i = 0; i < 3; i++) {
        cout << "Enter name: ";
        cin >> x[i].first;
        cout << "Enter number: ";
        cin >> x[i].second;
    }

    for(int i = 0; i < 3; i++)
        cout << i + 1 << ") " << x[i].first << "   " << x[i].second << endl;

    return 0;
}
```

3- Create a function that takes a pair as a parameter and prints its elements.

قم بإنشاء function تأخذ pair كـ parameter وتطبع عناصره.

Output

```
Name: John Doe
Number: 987654321
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<string>
#include<utility>

using namespace std;

void printPair(const pair<string, int>& p) {
    cout << "Name: " << p.first << endl;
    cout << "Number: " << p.second << endl;
}

int main() {
    pair<string, int> x;
    x.first = "John Doe";
    x.second = 987654321;

    printPair(x);

    return 0;
}
```

4- Create a function that takes a pair as a parameter and prints its elements.

قم بإنشاء function تأخذ pair كـ parameter وتطبع عناصره.

Input

```
Enter a string: GammalTech
Enter an integer: 123456
```

Output

```
First Element: GammalTech
Second Element: 123456
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<string>
#include<utility>

using namespace std;

void printPair(const pair<string, int>& p) {
    cout << "First Element: " << p.first << endl;
    cout << "Second Element: " << p.second << endl;
}

int main() {
    pair<string, int> x;

    cout << "Enter a string: ";
    cin >> x.first;

    cout << "Enter an integer: ";
    cin >> x.second;

    printPair(x);

    return 0;
}
```

5- Write a program and Use pairs to store coordinates (x, y) for a point, taking input from the user.

اكتب برنامجًا واستخدم pairs لتخزين إحداثيات (y، x) لنقطة ما، مع أخذ المدخلات من المستخدم.

Input

```
Enter X coordinate: 5
Enter Y coordinate: 7
```

Output

```
X Coordinate: 5
Y Coordinate: 7
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<utility>

using namespace std;

int main() {
    pair<int, int> point;

    cout << "Enter X coordinate: ";
    cin >> point.first;

    cout << "Enter Y coordinate: ";
    cin >> point.second;

    cout << "X Coordinate: " << point.first << endl;
    cout << "Y Coordinate: " << point.second << endl;

    return 0;
}
```

6- Compare two pairs and check if they are equal, taking input from the user.

قارن بين pairs وتحقق مما إذا كانا متساويين، مع أخذ المدخلات من المستخدم.

Input

```
Enter values for Pair 1 (two integers separated by space): 5 10
Enter values for Pair 2 (two integers separated by space): 5 10
```

Output

```
Pairs are equal.
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<utility>

using namespace std;

int main() {
    pair<int, int> pair1, pair2;

    cout << "Enter values for Pair 1 (two integers separated by space): ";
    cin >> pair1.first >> pair1.second;

    cout << "Enter values for Pair 2 (two integers separated by space): ";
    cin >> pair2.first >> pair2.second;

    if (pair1 == pair2)
        cout << "Pairs are equal." << endl;
    else
        cout << "Pairs are not equal." << endl;

    return 0;
}
```

7- Use pairs to represent a student's name and grade, and then compare their grades, taking input from the user.

استخدم pairs لتمثيل اسم الطالب ودرجته، ثم قارن درجاتهم، مع أخذ المدخلات من المستخدم.

Input

```
Enter name and grade for Student 1 (separated by space): Alice 85
Enter name and grade for Student 2 (separated by space): Bob 95
```

Output

```
Bob has a higher grade.
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<string>
#include<utility>

using namespace std;

int main() {
    pair<string, int> student1, student2;

    cout << "Enter name and grade for Student 1 (separated by space): ";
    cin >> student1.first >> student1.second;

    cout << "Enter name and grade for Student 2 (separated by space): ";
    cin >> student2.first >> student2.second;

    if (student1.second > student2.second)
        cout << student1.first << " has a higher grade." << endl;
    else if (student1.second < student2.second)
        cout << student2.first << " has a higher grade." << endl;
    else
        cout << "Both students have the same grade." << endl;

    return 0;
}
```

8- Write a program and Swap the values of two pairs, taking input from the user.

اكتب برنامجًا وقم بتبديل قيم زوجين، مع أخذ المدخلات من المستخدم.

Input

```
Enter values for Pair 1 (two integers separated by space): 3 7
Enter values for Pair 2 (two integers separated by space): 8 2
```

Output

```
Before Swap:
Pair 1: (3, 7)
Pair 2: (8, 2)
After Swap:
Pair 1: (8, 2)
Pair 2: (3, 7)
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<utility>

using namespace std;

int main() {
    pair<int, int> pair1, pair2;

    cout << "Enter values for Pair 1 (two integers separated by space): ";
    cin >> pair1.first >> pair1.second;

    cout << "Enter values for Pair 2 (two integers separated by space): ";
    cin >> pair2.first >> pair2.second;

    cout << "Before Swap:" << endl;
    cout << "Pair 1: (" << pair1.first << ", " << pair1.second << ")" << endl;
    cout << "Pair 2: (" << pair2.first << ", " << pair2.second << ")" << endl;

    swap(pair1, pair2);

    cout << "After Swap:" << endl;
    cout << "Pair 1: (" << pair1.first << ", " << pair1.second << ")" << endl;
    cout << "Pair 2: (" << pair2.first << ", " << pair2.second << ")" << endl;

    return 0;
}
```

9- Create a pair to store a person's name and height in centimeters, taking input from the user.

قم بإنشاء pair لتخزين اسم الشخص وطوله بالسنتيمتر، مع أخذ المدخلات من المستخدم.

Input

```
Enter person's name: Bob
Enter person's height (in centimeters): 175.5
```

Output

```
Name: Bob
Height: 175.5 cm
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<string>
#include<utility>

using namespace std;

int main() {
    pair<string, double> person;

    cout << "Enter person's name: ";
    cin >> person.first;

    cout << "Enter person's height (in centimeters): ";
    cin >> person.second;

    cout << "Name: " << person.first << endl;
    cout << "Height: " << person.second << " cm" << endl;

    return 0;
}
```

10- Create a pair to store the name and price of a product, taking input from the user.

قم بإنشاء pair لتخزين اسم المنتج وسعره، مع أخذ المدخلات من المستخدم.

Input

```
Enter product name: smartPhone
Enter price: $200.99
```

Output

```
Product: smartPhone
Price: $200.99
```

Solution

```cpp
// www.gammal.tech

#include<iostream>
#include<string>
#include<utility>

using namespace std;

int main() {
    pair<string, double> product;

    cout << "Enter product name: ";
    cin >> product.first;

    cout << "Enter price: $";
    cin >> product.second;

    cout << "Product: " << product.first << endl;
    cout << "Price: $" << product.second << endl;

    return 0;
}
```