

1- Create a program that uses a map to store city names along with their populations. Print the cities and populations in ascending order of populations.

قم بإنشاء برنامج يستخدم map لتخزين أسماء المدن مع سكانها. طباعة المدن والسكان بترتيب تصاعدي للسكان.

Output

```
Sorted by Population:
Delhi    Population: 30236315
Shanghai Population: 27342779
Tokyo    Population: 37833000
```

Solution

```
// www.gammal.tech

#include<iostream>
#include<string>
#include<map>

using namespace std;

int main() {
    map<string, int> cityPopulations;
    cityPopulations["Tokyo"] = 37833000;
    cityPopulations["Delhi"] = 30236315;
    cityPopulations["Shanghai"] = 27342779;

    map<string, int>::iterator it;
    cout << "Sorted by Population:" << endl;
    for (it = cityPopulations.begin(); it != cityPopulations.end(); it++) {
        cout << (*it).first << "\tPopulation: " << (*it).second << endl;
    }

    return 0;
}
```

2- Create a program that uses a map to store book titles along with their publication years. Print the books and publication years in descending order of years.

قم بإنشاء برنامج يستخدم map لتخزين عناوين الكتب مع سنوات نشرها. طباعة الكتب وسنوات النشر بالترتيب التنازلي للسنوات.

Output

```
Sorted by Publication Year (Descending):  
To Kill a Mockingbird   Publication Year: 1960  
The Great Gatsby       Publication Year: 1925  
1984                   Publication Year: 1949
```

Solution

```
// www.gammal.tech  
  
#include<iostream>  
#include<string>  
#include<map>  
  
using namespace std;  
  
int main() {  
    map<string, int> bookYears;  
    bookYears["The Great Gatsby"] = 1925;  
    bookYears["To Kill a Mockingbird"] = 1960;  
    bookYears["1984"] = 1949;  
  
    map<string, int>::reverse_iterator it;  
    cout << "Sorted by Publication Year (Descending):" << endl;  
    for (it = bookYears.rbegin(); it != bookYears.rend(); it++) {  
        cout << (*it).first << "\tPublication Year: " << (*it).second << endl;  
    }  
  
    return 0;  
}
```

3- Create a program that uses a map to store student names along with their corresponding exam scores. Print the names and scores in ascending order of names.

قم بإنشاء برنامج يستخدم map لتخزين أسماء الطلاب مع درجات الامتحانات المقابلة لهم. طباعة الأسماء والدرجات بترتيب تصاعدي للأسماء.

Output

```
Sorted by Name:
Alice   Score: 85
Bob     Score: 92
Charlie Score: 78
```

Solution

```
// www.gammal.tech

#include<iostream>
#include<string>
#include<map>

using namespace std;

int main() {
    map<string, int> studentScores;
    studentScores["Alice"] = 85;
    studentScores["Bob"] = 92;
    studentScores["Charlie"] = 78;

    map<string, int>::iterator it;
    cout << "Sorted by Name:" << endl;
    for (it = studentScores.begin(); it != studentScores.end(); it++) {
        cout << (*it).first << "\tScore: " << (*it).second << endl;
    }

    return 0;
}
```

4- Create a program that uses a map to store product names along with their prices. Print the products and prices in descending order of prices.

إنشاء برنامج يستخدم map لتخزين أسماء المنتجات وأسعارها. طباعة المنتجات والأسعار بترتيب تنازلي للأسعار.

Output

```
Sorted by Price (Descending):  
Tablet Price: $159  
Smartphone Price: $1299.6  
Laptop Price: $899.99  
Headphones Price: $357
```

Solution

```
// www.gammal.tech  
  
#include<iostream>  
#include<string>  
#include<map>  
  
using namespace std;  
  
int main() {  
    map<string, double> productPrices;  
    productPrices["Laptop"] = 899.99;  
    productPrices["Smartphone"] = 1299.6;  
    productPrices["Tablet"] = 159.0;  
    productPrices["Headphones"] = 357.0;  
  
    map<string, double>::reverse_iterator it;  
    cout << "Sorted by Price (Descending):" << endl;  
    for (it = productPrices.rbegin(); it != productPrices.rend(); it++) {  
        cout << (*it).first << "\tPrice: $" << (*it).second << endl;  
    }  
  
    return 0;  
}
```

5- Create a program that uses a map to store programming languages along with their release years. Print the languages and release years in ascending order of years.

قم بإنشاء برنامج يستخدم map لتخزين لغات البرمجة مع سنوات إصدارها. اطبع اللغات وسنوات الإصدار بترتيب تصاعدي للسنوات.

Output

```
Sorted by Release Year:
C++ Release Year: 1983
Java   Release Year: 1995
Python Release Year: 1991
```

Solution

```
// www.gammal.tech

#include<iostream>
#include<string>
#include<map>

using namespace std;

int main() {
    map<string, int> programmingLanguages;
    programmingLanguages["C++"] = 1983;
    programmingLanguages["Java"] = 1995;
    programmingLanguages["Python"] = 1991;

    map<string, int>::iterator it;
    cout << "Sorted by Release Year:" << endl;
    for (it = programmingLanguages.begin(); it != programmingLanguages.end(); it++) {
        cout << (*it).first << "\tRelease Year: " << (*it).second << endl;
    }

    return 0;
}
```

6- Create a program that initializes a map with predefined data representing courses and their corresponding credit hours. The program should print the courses and credit hours in ascending order of courses.

قم بإنشاء برنامج يقوم بتهيئة map بيانات محددة مسبقاً تمثل المقررات الدراسية والساعات المعتمدة المقابلة لها. يجب أن يقوم البرنامج بطباعة المقررات والساعات المعتمدة بترتيب تصاعدي للمقررات.

Output

```
Sorted by Course Name:
Course: Computer Science    Credit Hours: 5
Course: History Credit Hours: 3
Course: Mathematics Credit Hours: 4
Course: Physics Credit Hours: 3
```

Solution

```
//www.gammal.tech

#include<iostream>
#include<string>
#include<map>

using namespace std;

int main() {
    // Initialize map with predefined data
    map<string, int> courseCreditHours = {
        {"Mathematics", 4},
        {"Physics", 3},
        {"Computer Science", 5},
        {"History", 3}
    };

    // Print courses and credit hours in ascending order of courses
    map<string, int>::iterator it;
    cout << "Sorted by Course Name:" << endl;
    for (it = courseCreditHours.begin(); it != courseCreditHours.end(); it++) {
        cout << "Course: " << (*it).first << "\tCredit Hours: " << (*it).second << endl;
    }

    return 0;
}
```

7- Create a program that allows the user to input and store country names along with their respective capitals using a map. Print the countries and capitals in alphabetical order of countries.

إنشاء برنامج يسمح للمستخدم بإدخال وتخزين أسماء الدول وعواصمها باستخدام map . طباعة الدول والعواصم بالترتيب الأبجدي للبلدان.

Input

```
Enter country name: France
Enter capital: Paris
Enter country name: Japan
Enter capital: Tokyo
Enter country name: USA
Enter capital: Washington
```

Output

```
Sorted by Country Name:
Country: France Capital: Paris
Country: Japan   Capital: Tokyo
Country: USA     Capital: Washington
```

Solution

```
//www.gammal.tech

#include<iostream>
#include<string>
#include<map>

using namespace std;

int main() {
    map<string, string> countryCapitals;

    for (int i = 0; i < 3; i++) {
        string country, capital;

        cout << "Enter country name: ";
        cin >> country;

        cout << "Enter capital: ";
        cin >> capital;

        countryCapitals[country] = capital;
    }

    map<string, string>::iterator it;
    cout << "Sorted by Country Name:" << endl;
    for (it = countryCapitals.begin(); it != countryCapitals.end(); it++) {
        cout << "Country: " << (*it).first << "\tCapital: " << (*it).second << endl;
    }

    return 0;
}
```

8- Create a program that utilizes a map to store the names of cities and their respective average temperatures. The program should initialize the map with predefined data and then print the cities and average temperatures in ascending order of city names.

قم بإنشاء برنامج يستخدم map لتخزين أسماء المدن ومتوسط درجات الحرارة الخاصة بها. يجب أن يقوم البرنامج بتهيئة map بيانات محددة مسبقاً ثم طباعة المدن ومتوسط درجات الحرارة بترتيب تصاعدي لأسماء المدن.

Output

```
Sorted by City Name:
City: New York Average Temperature (°C): 12.6
City: Paris Average Temperature (°C): 15.8
City: Sydney Average Temperature (°C): 25.3
City: Tokyo Average Temperature (°C): 20.5
```

Solution

```
//www.gammal.tech

#include<iostream>
#include<string>
#include<map>

using namespace std;

int main() {
    // Initialize map with predefined data
    map<string, double> cityTemperatures = {
        {"Tokyo", 20.5},
        {"Paris", 15.8},
        {"New York", 12.6},
        {"Sydney", 25.3}
    };

    // Print cities and temperatures in ascending order of city names
    map<string, double>::iterator it;
    cout << "Sorted by City Name:" << endl;
    for (it = cityTemperatures.begin(); it != cityTemperatures.end(); it++) {
        cout << "City: " << (*it).first << "\tAverage Temperature (°C): " << (*it).second << endl;
    }

    return 0;
}
```


9- Create a program that uses a map to store car models and their corresponding production years. The program should initialize the map with predefined data and then print the car models and production years in descending order of production years.

قم بإنشاء برنامج يستخدم map لتخزين نماذج السيارات وسنوات الإنتاج المقابلة لها. يجب أن يقوم البرنامج بتهيئة map بالبيانات المحددة مسبقاً ومن ثم طباعة موديلات السيارة وسنوات الإنتاج بترتيب تنازلي لسنوات الإنتاج.

Output

```
Sorted by Production Year (Descending):
Car Model: Toyota Camry Production Year: 1982
Car Model: Honda Civic Production Year: 1972
Car Model: Ford Mustang Production Year: 1964
Car Model: Chevrolet Corvette Production Year: 1953
```

Solution

```
//www.gammal.tech

#include<iostream>
#include<string>
#include<map>

using namespace std;

int main() {
    // Initialize map with predefined data
    map<string, int> carProductionYears = {
        {"Toyota Camry", 1982},
        {"Ford Mustang", 1964},
        {"Honda Civic", 1972},
        {"Chevrolet Corvette", 1953}
    };

    // Print car models and production years in descending order of production years
    map<string, int>::reverse_iterator it;
    cout << "Sorted by Production Year (Descending):" << endl;
    for (it = carProductionYears.rbegin(); it != carProductionYears.rend(); it++) {
        cout << "Car Model: " << (*it).first << "\tProduction Year: " << (*it).second << endl;
    }

    return 0;
}
```

10- Create a program that uses a map to store student names along with their grades (e.g., A, B, C). The program should allow the user to input the data and then print the student names and grades in alphabetical order of names.

قم بإنشاء برنامج يستخدم map لتخزين أسماء الطلاب مع درجاتهم (على سبيل المثال، A، B، C). يجب أن يسمح البرنامج للمستخدم بإدخال البيانات ومن ثم طباعة أسماء الطلاب ودرجاتهم بالترتيب الأبجدي للأسماء.

Input

```
Enter student name: Alice
Enter grade (A, B, C, etc.): B
Enter student name: Bob
Enter grade (A, B, C, etc.): A
Enter student name: Charlie
Enter grade (A, B, C, etc.): C
```

Output

```
Sorted by Student Name:
Student: Alice   Grade: B
Student: Bob     Grade: A
Student: Charlie Grade: C
```

Solution

```
//www.gammal.tech

#include<iostream>
#include<string>
#include<map>

using namespace std;

int main() {
    map<string, char> studentGrades;

    // Input student data
    for (int i = 0; i < 3; i++) {
        string studentName;
        char grade;

        cout << "Enter student name: ";
        cin >> studentName;

        cout << "Enter grade (A, B, C, etc.): ";
        cin >> grade;

        studentGrades[studentName] = grade;
    }

    // Print student names and grades in alphabetical order of names
    map<string, char>::iterator it;
    cout << "Sorted by Student Name:" << endl;
    for (it = studentGrades.begin(); it != studentGrades.end(); it++) {
        cout << "Student: " << (*it).first << "\tGrade: " << (*it).second << endl;
    }

    return 0;
}
```