
Lista de actividades

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Al final de este enunciado podeis encontrar un programa a medio hacer que hay que completar. Concretamente, hay dos funciones que estan pendientes de implementar. A continuación se explica con qué datos trabaja el programa y qué tienen que hacer las funciones.

El programa trabaja con un tipo de datos `Activity`, que representa una actividad, que incluye el nombre de la actividad (`name`), el instante de tiempo de inicio de la actividad (`t1`), y el instante de tiempo de finalización de la actividad (`t2`). Para simplificar, `t1` y `t2` son variables enteras, y el programa siempre trabaja con actividades correctamente definidas cumpliendo $t1 < t2$:

```
struct Activity {
    string name;
    int t1, t2;
}
```

El programa también trabaja con un tipo de dato `ListActivities`, que representa una lista de actividades:

```
typedef vector<Activity> ListActivities;
```

Hay que implementar una función para verificar que dos actividades son compatibles en tiempo, es decir, que no se solapan. En el caso particular de que una de las actividades acaba exactamente cuando la otra empieza, se consideran compatibles.

```
bool compatibleActivities(Activity a, Activity b);
```

Además, hay que implementar otra función que recibe dos actividades y retorna cierto si la primera es menor que la segunda según el criterio que se describe a continuación. Una actividad es menor que otra si comienza estrictamente antes que la otra, o comienza a la vez que la otra y acaba estrictamente antes, o comienza y acaba a la vez que la otra pero su nombre es menor que el nombre de la otra en orden lexicográfico.

```
bool smallerActivity(Activity a, Activity b);
```

La función anterior se utiliza desde otro sitio del programa para ordenar todas las actividades.

Completad, entonces, el siguiente código inacabado para solucionar el ejercicio:

```
#include <iostream>
#include <string>
#include <vector>
#include <algorithm>

// Here you can add more includes if you wish.

using namespace std;
```

```

struct Activity {
    string name;
    int t1, t2; // t1<t2 must be satisfied for a correct activity
};

typedef vector<Activity> ListActivities;

// Auxiliary functions (you can add more functions if you wish)

// Pre: The input contains a description of an activity with the format:
//
//     name t1 t2
//
//     where name is a non-empty string with lowercase letters and t1<t2
// Post: Returns the activity read from the input adapted to the format of stru
Activity readActivity()
{
    Activity a;
    cin >> a.name >> a.t1 >> a.t2;
    return a;
}

// Pre: listactivities represents a list of correct activities
// Post: Prints all activities from first to last, one per line, and with the f
//
//     name t1 t2
void printActivities(const ListActivities &listactivities)
{
    for (int i = 0; i < int(listactivities.size()); i++) {
        const Activity &a = listactivities[i];
        cout << a.name << " " << a.t1 << " " << a.t2 << endl;
    }
}

// Pre: a, b represent correct activities.
// Post: Returns true iff the activities have a compatible timeline,
//     i.e. they do not overlap in time.
//     Note: if one of them finishes exactly when the other starts, then they
bool compatibleActivities(Activity a, Activity b)
{
    // Implement this function.
    // ...
}

// Pre: a, b represent correct activities.
// Post: Returns true iff one of the following conditions holds:
//
//     - a starts strictly before b.
//
//     - a and b start at the same time but a finishes before b.
//
//     - a and b coincide in start and end time, but a has lexicographically

```

```

bool smallerActivity(Activity a, Activity b)
{
    // Implement this function.
    // ...
}

int main()
{
    ListActivities listactivities;
    string command;
    while (cin >> command) {
        if (command == "NEW") {
            listactivities.push_back(readActivity());
        } else if (command == "SORT") {
            sort(listactivities.begin(), listactivities.end(), smallerActivity);
        } else if (command == "PRINT") {
            cout << "Current list activities:" << endl;
            printActivities(listactivities);
            cout << endl;
        } else if (command == "CHECKCOMPATIBLE") {
            int i, j;
            cin >> i >> j;
            string namei = listactivities[i].name;
            string namej = listactivities[j].name;
            if (compatibleActivities(listactivities[i], listactivities[j]))
                cout << "Activities " << namei << " and " << namej << " are compatible"
            else
                cout << "Activities " << namei << " and " << namej << " are incompatible"
            cout << endl;
        }
    }
}

```

Entrada

La entrada consiste en una lista de comandos para crear nuevas actividades, ordenarlas, escribirlas todas, y comprobar si dos de ellas son compatibles. No hay que preocuparse mucho por el main ya que se da hecho y se encarga de llamar a las funciones para gestionar los comandos.

Salida

La salida muestra los resultados de los comandos. No hay que preocuparse sobre la salida porque el main que se da hecho ya se encarga de llamar a las correspondientes funciones para producir la salida.

Ejemplo de entrada 1

```

NEW biking 169 277
PRINT
SORT

```

```

NEW cinema 224 598
SORT
PRINT
NEW jogging 108 483
PRINT

```

CHECKCOMPATIBLE 0 1
CHECKCOMPATIBLE 1 2
SORT
PRINT
NEW gym 24 184
NEW swimming 218 574
CHECKCOMPATIBLE 2 3
PRINT
SORT
NEW chatting 161 501
SORT
NEW climbing 26 510
PRINT
NEW reading 207 303
NEW siteseeing 440 561
PRINT
NEW strolling 318 385
PRINT
SORT
PRINT
CHECKCOMPATIBLE 1 7
NEW bowling 413 553
NEW boxing 42 253
PRINT
NEW writing 77 154
PRINT
SORT
NEW flirting 84 320
PRINT
NEW singing 281 548
CHECKCOMPATIBLE 6 7
PRINT
CHECKCOMPATIBLE 4 9
CHECKCOMPATIBLE 1 5
NEW dancing 398 498
CHECKCOMPATIBLE 7 8
NEW shopping 28 58
PRINT
CHECKCOMPATIBLE 3 5
CHECKCOMPATIBLE 0 13
SORT
NEW cooking 182 530
CHECKCOMPATIBLE 6 14
PRINT
NEW praying 54 433
SORT
NEW fishing 435 599
PRINT
CHECKCOMPATIBLE 9 14
SORT
CHECKCOMPATIBLE 0 7
PRINT
CHECKCOMPATIBLE 10 19
CHECKCOMPATIBLE 10 17
CHECKCOMPATIBLE 4 19
NEW hunting 380 465
PRINT
CHECKCOMPATIBLE 2 4
CHECKCOMPATIBLE 0 17
CHECKCOMPATIBLE 11 13
SORT

CHECKCOMPATIBLE 5 16
PRINT
CHECKCOMPATIBLE 1 14
CHECKCOMPATIBLE 7 14
CHECKCOMPATIBLE 7 14
CHECKCOMPATIBLE 1 13
CHECKCOMPATIBLE 4 12
CHECKCOMPATIBLE 9 12
CHECKCOMPATIBLE 5 8
CHECKCOMPATIBLE 8 15
CHECKCOMPATIBLE 5 7
CHECKCOMPATIBLE 5 11
CHECKCOMPATIBLE 9 10
CHECKCOMPATIBLE 17 18
CHECKCOMPATIBLE 1 9
CHECKCOMPATIBLE 3 18
CHECKCOMPATIBLE 5 16
CHECKCOMPATIBLE 4 17
CHECKCOMPATIBLE 10 16
CHECKCOMPATIBLE 8 17
CHECKCOMPATIBLE 1 3
CHECKCOMPATIBLE 17 20
CHECKCOMPATIBLE 1 12
CHECKCOMPATIBLE 8 10
CHECKCOMPATIBLE 0 3
CHECKCOMPATIBLE 4 11
CHECKCOMPATIBLE 4 11
CHECKCOMPATIBLE 12 19
CHECKCOMPATIBLE 0 16
CHECKCOMPATIBLE 4 11
CHECKCOMPATIBLE 9 11

Ejemplo de salida 1

Current list activities:
biking 169 277

Current list activities:
biking 169 277
cinema 224 598

Current list activities:
biking 169 277
cinema 224 598
jogging 108 483

Activities biking and cinema are incompatible

Activities cinema and jogging are incompatible

Current list activities:
jogging 108 483
biking 169 277
cinema 224 598

Activities cinema and gym are compatible

Current list activities:
jogging 108 483
biking 169 277
cinema 224 598
gym 24 184
swimming 218 574

Current list activities:
gym 24 184
jogging 108 483
chatting 161 501
biking 169 277
swimming 218 574
cinema 224 598
climbing 26 510

Current list activities:
gym 24 184
jogging 108 483
chatting 161 501
biking 169 277
swimming 218 574
cinema 224 598
climbing 26 510
reading 207 303
siteseeing 440 561

Current list activities:
gym 24 184
jogging 108 483
chatting 161 501
biking 169 277
swimming 218 574
cinema 224 598
climbing 26 510
reading 207 303

siteseeing 440 561
strolling 318 385

Current list activities:
gym 24 184
climbing 26 510
jogging 108 483
chatting 161 501
biking 169 277
reading 207 303
swimming 218 574
cinema 224 598
strolling 318 385
siteseeing 440 561

Activities climbing and cinema are incompatible

Current list activities:
gym 24 184
climbing 26 510
jogging 108 483
chatting 161 501
biking 169 277
reading 207 303
swimming 218 574
cinema 224 598
strolling 318 385
siteseeing 440 561
bowling 413 553
boxing 42 253

Current list activities:
gym 24 184
climbing 26 510
jogging 108 483
chatting 161 501
biking 169 277
reading 207 303
swimming 218 574
cinema 224 598
strolling 318 385
siteseeing 440 561
bowling 413 553
boxing 42 253
writing 77 154

Current list activities:
gym 24 184
climbing 26 510
boxing 42 253
writing 77 154
jogging 108 483
chatting 161 501
biking 169 277
reading 207 303
swimming 218 574
cinema 224 598
strolling 318 385
bowling 413 553
siteseeing 440 561
flirting 84 320

Activities biking and reading are incompatible	reading 207 303 swimming 218 574 cinema 224 598 singing 281 548 strolling 318 385 dancing 398 498 bowling 413 553 siteseeing 440 561 cooking 182 530
Current list activities: gym 24 184 climbing 26 510 boxing 42 253 writing 77 154 jogging 108 483 chatting 161 501 biking 169 277 reading 207 303 swimming 218 574 cinema 224 598 strolling 318 385 bowling 413 553 siteseeing 440 561 flirting 84 320 singing 281 548	Current list activities: gym 24 184 climbing 26 510 shopping 28 58 boxing 42 253 praying 54 433 writing 77 154 flirting 84 320 jogging 108 483 chatting 161 501 biking 169 277 cooking 182 530 reading 207 303 swimming 218 574 cinema 224 598 singing 281 548 strolling 318 385 dancing 398 498 bowling 413 553 siteseeing 440 561 fishing 435 599
Activities jogging and cinema are incompatible	Activities biking and singing are compatible
Activities climbing and chatting are incompatible	Activities gym and jogging are incompatible
Activities reading and swimming are incompatible	Current list activities: gym 24 184 climbing 26 510 shopping 28 58 boxing 42 253 praying 54 433 writing 77 154 flirting 84 320 jogging 108 483 chatting 161 501 biking 169 277 cooking 182 530 reading 207 303 swimming 218 574 cinema 224 598 singing 281 548 strolling 318 385 dancing 398 498 bowling 413 553 fishing 435 599 siteseeing 440 561
Current list activities: gym 24 184 climbing 26 510 boxing 42 253 writing 77 154 jogging 108 483 chatting 161 501 biking 169 277 reading 207 303 swimming 218 574 cinema 224 598 strolling 318 385 bowling 413 553 siteseeing 440 561 flirting 84 320 singing 281 548 dancing 398 498 shopping 28 58	Activities writing and chatting are compatible
Activities writing and chatting are compatible	Activities gym and flirting are incompatible
Activities gym and flirting are incompatible	Activities jogging and dancing are incompatible
Activities jogging and dancing are incompatible	Current list activities: gym 24 184 climbing 26 510 shopping 28 58 boxing 42 253 writing 77 154 flirting 84 320 jogging 108 483 chatting 161 501 biking 169 277
Current list activities: gym 24 184 climbing 26 510 shopping 28 58 boxing 42 253 writing 77 154 flirting 84 320 jogging 108 483 chatting 161 501 biking 169 277	Activities cooking and siteseeing are incompatible Activities cooking and bowling are incompatible

Activities praying and siteseeing are compatible	Activities jogging and singing are incompatible
Current list activities:	Activities jogging and singing are incompatible
gym 24 184	Activities climbing and cinema are incompatible
climbing 26 510	Activities praying and swimming are incompatible
shopping 28 58	Activities biking and swimming are incompatible
boxing 42 253	Activities writing and chatting are compatible
praying 54 433	Activities chatting and strolling are incompatible
writing 77 154	Activities writing and jogging are incompatible
flirting 84 320	Activities writing and reading are compatible
jogging 108 483	Activities biking and cooking are incompatible
chatting 161 501	Activities dancing and bowling are incompatible
biking 169 277	Activities climbing and biking are incompatible
cooking 182 530	Activities boxing and bowling are compatible
reading 207 303	Activities writing and hunting are compatible
swimming 218 574	Activities praying and dancing are incompatible
cinema 224 598	Activities cooking and hunting are incompatible
singing 281 548	Activities chatting and dancing are incompatible
strolling 318 385	Activities climbing and boxing are incompatible
dancing 398 498	Activities dancing and siteseeing are incompatible
bowling 413 553	Activities climbing and swimming are incompatible
fishing 435 599	Activities chatting and cooking are incompatible
siteseeing 440 561	Activities gym and boxing are incompatible
hunting 380 465	Activities praying and reading are incompatible
Activities shopping and praying are incompatible	Activities praying and reading are incompatible
Activities gym and bowling are compatible	Activities swimming and fishing are incompatible
Activities reading and cinema are incompatible	Activities gym and hunting are compatible
Activities writing and hunting are compatible	Activities praying and reading are incompatible
Current list activities:	Activities biking and reading are incompatible
gym 24 184	Activities climbing and singing are incompatible
climbing 26 510	
shopping 28 58	
boxing 42 253	
praying 54 433	
writing 77 154	
flirting 84 320	
jogging 108 483	
chatting 161 501	
biking 169 277	
cooking 182 530	
reading 207 303	
swimming 218 574	
cinema 224 598	
singing 281 548	
strolling 318 385	
hunting 380 465	
dancing 398 498	
bowling 413 553	
fishing 435 599	
siteseeing 440 561	

Ejemplo de entrada 2

```
NEW biking 1 3
PRINT
NEW cinema 2 3
CHECKCOMPATIBLE 0 1
PRINT
NEW jogging 0 3
NEW gym 1 3
PRINT
NEW swimming 2 3
PRINT
CHECKCOMPATIBLE 2 3
CHECKCOMPATIBLE 3 4
CHECKCOMPATIBLE 1 4
CHECKCOMPATIBLE 1 3
NEW chatting 0 1
CHECKCOMPATIBLE 0 2
NEW climbing 1 2
NEW reading 0 1
NEW siteseeing 1 2
PRINT
NEW strolling 0 1
CHECKCOMPATIBLE 2 7
CHECKCOMPATIBLE 3 6
CHECKCOMPATIBLE 0 7
PRINT
CHECKCOMPATIBLE 2 7
CHECKCOMPATIBLE 0 8
SORT
NEW bowling 0 1
CHECKCOMPATIBLE 4 10
PRINT
NEW boxing 0 1
CHECKCOMPATIBLE 4 7
PRINT
CHECKCOMPATIBLE 6 10
NEW writing 1 2
NEW flirting 1 3
SORT
PRINT
CHECKCOMPATIBLE 3 8
NEW singing 1 2
PRINT
CHECKCOMPATIBLE 1 4
NEW dancing 1 3
NEW shopping 1 3
PRINT
SORT
CHECKCOMPATIBLE 0 3
CHECKCOMPATIBLE 5 11
NEW cooking 2 3
PRINT
NEW praying 1 3
CHECKCOMPATIBLE 0 17
NEW fishing 0 3
PRINT
SORT
CHECKCOMPATIBLE 8 18
PRINT
NEW hunting 0 3
```

```
SORT
PRINT
CHECKCOMPATIBLE 4 5
CHECKCOMPATIBLE 3 8
CHECKCOMPATIBLE 7 13
CHECKCOMPATIBLE 14 16
CHECKCOMPATIBLE 8 17
CHECKCOMPATIBLE 15 17
CHECKCOMPATIBLE 18 20
CHECKCOMPATIBLE 4 16
CHECKCOMPATIBLE 0 11
CHECKCOMPATIBLE 4 8
CHECKCOMPATIBLE 2 15
CHECKCOMPATIBLE 15 16
CHECKCOMPATIBLE 2 3
CHECKCOMPATIBLE 1 11
CHECKCOMPATIBLE 4 17
CHECKCOMPATIBLE 8 11
CHECKCOMPATIBLE 9 19
CHECKCOMPATIBLE 11 20
CHECKCOMPATIBLE 11 17
CHECKCOMPATIBLE 10 12
CHECKCOMPATIBLE 6 14
CHECKCOMPATIBLE 6 16
CHECKCOMPATIBLE 2 3
CHECKCOMPATIBLE 1 19
CHECKCOMPATIBLE 16 20
CHECKCOMPATIBLE 5 11
CHECKCOMPATIBLE 1 6
CHECKCOMPATIBLE 4 12
CHECKCOMPATIBLE 0 10
CHECKCOMPATIBLE 8 11
CHECKCOMPATIBLE 0 7
CHECKCOMPATIBLE 9 16
CHECKCOMPATIBLE 10 17
CHECKCOMPATIBLE 2 9
CHECKCOMPATIBLE 2 11
CHECKCOMPATIBLE 4 11
CHECKCOMPATIBLE 5 14
CHECKCOMPATIBLE 19 20
CHECKCOMPATIBLE 1 19
```


Ejemplo de salida 2

Current list activities:
biking 1 3

Activities biking and cinema are incompatible

Current list activities:
biking 1 3
cinema 2 3

Current list activities:
biking 1 3
cinema 2 3
jogging 0 3
gym 1 3

Current list activities:
biking 1 3
cinema 2 3
jogging 0 3
gym 1 3
swimming 2 3

Activities jogging and gym are incompatible

Activities gym and swimming are incompatible

Activities cinema and swimming are incompatible

Activities cinema and gym are incompatible

Activities biking and jogging are incompatible

Current list activities:
biking 1 3
cinema 2 3
jogging 0 3
gym 1 3
swimming 2 3
chatting 0 1
climbing 1 2
reading 0 1
siteseeing 1 2

Activities jogging and reading are incompatible

Activities gym and climbing are incompatible

Activities biking and reading are compatible

Current list activities:
biking 1 3
cinema 2 3
jogging 0 3
gym 1 3
swimming 2 3
chatting 0 1
climbing 1 2
reading 0 1
siteseeing 1 2

strolling 0 1

Activities jogging and reading are incompatible

Activities biking and siteseeing are incompatible

Activities climbing and bowling are compatible

Current list activities:
chatting 0 1
reading 0 1
strolling 0 1
jogging 0 3
climbing 1 2
siteseeing 1 2
biking 1 3
gym 1 3
cinema 2 3
swimming 2 3
bowling 0 1

Activities climbing and gym are incompatible

Current list activities:

chatting 0 1
reading 0 1
strolling 0 1
jogging 0 3
climbing 1 2
siteseeing 1 2
biking 1 3
gym 1 3
cinema 2 3
swimming 2 3
bowling 0 1
boxing 0 1

Activities biking and bowling are compatible

Current list activities:

bowling 0 1
boxing 0 1
chatting 0 1
reading 0 1
strolling 0 1
jogging 0 3
climbing 1 2
siteseeing 1 2
writing 1 2
biking 1 3

flirting 1 3

gym 1 3

cinema 2 3

swimming 2 3

Activities reading and writing are compatible

Current list activities:

bowling 0 1
boxing 0 1
chatting 0 1

reading 0 1
strolling 0 1
jogging 0 3
climbing 1 2
sitereeing 1 2
writing 1 2
biking 1 3
flirting 1 3
gym 1 3
cinema 2 3
swimming 2 3
singing 1 2

Activities boxing and strolling are incompatible

Current list activities:

bowling 0 1
boxing 0 1
chatting 0 1
reading 0 1
strolling 0 1
jogging 0 3
climbing 1 2
sitereeing 1 2
writing 1 2
biking 1 3
flirting 1 3
gym 1 3
cinema 2 3
swimming 2 3
singing 1 2
dancing 1 3
shopping 1 3

Activities bowling and reading are incompatible

Activities jogging and dancing are incompatible

Current list activities:

bowling 0 1
boxing 0 1
chatting 0 1
reading 0 1
strolling 0 1
jogging 0 3
climbing 1 2
singing 1 2
sitereeing 1 2
writing 1 2
biking 1 3
dancing 1 3
flirting 1 3
gym 1 3
shopping 1 3
cinema 2 3
swimming 2 3
cooking 2 3

Activities bowling and cooking are compatible

Current list activities:

bowling 0 1
boxing 0 1
chatting 0 1
reading 0 1
strolling 0 1
jogging 0 3
climbing 1 2
singing 1 2
sitereeing 1 2
writing 1 2
biking 1 3
dancing 1 3
flirting 1 3
shopping 1 3
cinema 2 3
swimming 2 3
cooking 2 3
praying 1 3
fishing 0 3

Activities singing and cooking are compatible

Current list activities:

bowling 0 1
boxing 0 1
chatting 0 1
reading 0 1
strolling 0 1
fishing 0 3
jogging 0 3
climbing 1 2
singing 1 2
sitereeing 1 2
writing 1 2
biking 1 3
flirting 1 3
gym 1 3
praying 1 3
shopping 1 3
cinema 2 3
cooking 2 3
swimming 2 3

Current list activities:

bowling 0 1
boxing 0 1
chatting 0 1
reading 0 1
strolling 0 1
fishing 0 3
hunting 0 3
jogging 0 3
climbing 1 2
singing 1 2
sitereeing 1 2
writing 1 2
biking 1 3
dancing 1 3
flirting 1 3

gym 1 3	Activities writing and shopping are incompatible
praying 1 3	
shopping 1 3	Activities siteseeing and biking are incompatible
cinema 2 3	
cooking 2 3	Activities hunting and flirting are incompatible
swimming 2 3	
Activities strolling and fishing are incompatible	Activities hunting and praying are incompatible
Activities reading and climbing are compatible	Activities chatting and reading are incompatible
Activities jogging and dancing are incompatible	Activities boxing and cooking are compatible
Activities flirting and praying are incompatible	Activities praying and swimming are incompatible
Activities climbing and shopping are incompatible	Activities fishing and writing are incompatible
Activities gym and shopping are incompatible	Activities boxing and hunting are incompatible
Activities cinema and swimming are incompatible	Activities strolling and biking are compatible
Activities strolling and praying are compatible	Activities bowling and siteseeing are compatible
Activities bowling and writing are compatible	Activities climbing and writing are incompatible
Activities strolling and climbing are compatible	Activities bowling and jogging are incompatible
Activities chatting and gym are compatible	Activities singing and praying are incompatible
Activities gym and praying are incompatible	Activities siteseeing and shopping are incompatible
Activities chatting and reading are incompatible	Activities chatting and singing are compatible
Activities boxing and writing are compatible	Activities chatting and writing are compatible
Activities strolling and shopping are compatible	Activities strolling and writing are compatible
Activities climbing and writing are incompatible	Activities fishing and flirting are incompatible
Activities singing and cooking are compatible	Activities cooking and swimming are incompatible
Activities writing and swimming are compatible	Activities boxing and cooking are compatible

Información del problema

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