Case Study

Rupesh Nasre.

OOAIA
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Common Mistakes and Pitfalls

- Bad coding standards
  - Use a consistent style.
- Public members in classes
  - Use as restrictive access as you can.
- Using cryptic names
  - Code should be readable (understandable).
- Writing code for the assignment
  - Add generality.

Design

Classwork: Note down all the ways in which this design can be improved.

```
#include <cmath>
...
using namespace std;
class GraphFe{
    public:
    int age;
    string mton;
}
class GraphMa{
    public:
    int age;
    string mton;
}
struct comp
{   const bool operator ()(const GraphFe& x ,const GraphFe& y) const
{
 return (x.age<y.age);
}};
struct comp1
{   const bool operator ()(const GraphMa& x ,const GraphMa& y) const
{
    return (x.age<y.age);
}};
set<GraphFe,comp> g1[11];
set<GraphMa,comp1> g2[11];
set<int> mage;
set<int>fage;
```

With due apologies to the student.

Implementation

```
#include <cmath>
...
#include <algorithm>
using namespace std;
class mstu{
  public:
    int age,cg;
    string mo_to;
};
class fstu{
    public:
    int age,cg;
    string mo_to;
};
class Bipar_graph{
    int mno,fno;
    public:
    Bipar_graph(int m,int f)
    {
        mno=m;fno=f;
    }
    int max_mat(vector<mstu> &,vector<fstu> &);
    bool bpm(bool adj_mat[][501],int u,bool vi[],int match[]);
};
```

Classwork: Note down all the positive points about this code.

```
bool Bipar_graph::bpm(bool adj_mat[][501], int u,
         bool vi[], int mat[])
{
    for (int v=0;v<fno;v++) {
        if (adj_mat[u][v]&&(!vi[v])&&(vi[v]=1))
        {
            if ((mat[v]<0)|| bpm(adj_mat, mat[v], vi, mat)) {
                mat[v] = u;
                return 1; }
        }
    }
    return 0;
}
```

```
int Bipar_graph::max_mat(vector<mstu> & v1,vector<fstu> & v2)
{
    bool bp[mno][501];
    for (int i=0;i<mno;i++)for (int j=0;j<fno;j++){
        if (v1[i].cg==v2[j].cg)
            bp[i][j]=0;
        else if (v1[i].mo_to!=v2[j].mo_to)
            bp[i][j]=0;
        else if (abs(v1[i].age-v2[j].age)>=3)
            bp[i][j]=0;
        else
            bp[i][j]=1;
    }
    int mat[fno]; for (int i=0;i<fno;i++) mat[i]=-1;
    int res = 0;
    for (int u=0;u<mno;u++)
    {
        bool vi[fno]={0};
        if (bpm(bp, u, vi, mat))
            res++;
    }
    return res;
}
```

```
int main() {
    /* Enter your code here. Read input from STDIN. Print output to STDOUT */
    int t;cin>>t;while (t--){
        int n,n1;cin>>n;n1=n;vector<mstu> v1;vector<fstu> v2;while (n--){
            int ag,cg;string gen,mo;
            cin>>ag>>gen>>mo>>cg;
            if (gen=="M")
            {
                mstu m;m.age=ag;m.cg=cg;m.mo_to=mo;
                v1.push_back(m);
            }
            else{
                fstu f;f.age=ag;f.cg=cg;f.mo_to=mo;
                v2.push_back(f);
            }
        }
        Bipar_graph bg(v1.size(),v2.size());
        cout<<n1-bg.max_mat(v1,v2)<<endl;
    }
    return 0;
}
```