**Bài 4:**

**Hàm class:**

using System;

using System.Collections.Generic;

namespace BaiTapQLSV

{

    class QuanLySinhVien

    {

        private List<SinhVien> ListSinhVien = null;

        public QuanLySinhVien() {

            ListSinhVien = new List<SinhVien>();

        }

        private int GenerateID()

        {

            int max = 1;

            if (ListSinhVien != null && ListSinhVien.Count > 0)

            {

                max = ListSinhVien[0].ID;

                foreach (SinhVien sv in ListSinhVien)

                {

                    if (max < sv.ID)

                    {

                        max = sv.ID;

                    }

                }

                max++;

            }

            return max;

        }

        public int SoLuongSinhVien()

        {

            int Count = 0;

            if (ListSinhVien != null)

            {

                Count = ListSinhVien.Count;

            }

            return Count;

        }

        public void NhapSinhVien()

        {

            SinhVien sv = new SinhVien();

            sv.ID = GenerateID();

            Console.Write("Nhap ten sinh vien: ");

            sv.Name = Convert.ToString(Console.ReadLine());

            Console.Write("Nhap gioi tinh sinh vien: ");

            sv.Sex = Convert.ToString(Console.ReadLine());

            Console.Write("Nhap tuoi sinh vien: ");

            sv.Age = Convert.ToInt32(Console.ReadLine());

            Console.Write("Nhap diem toan: ");

            sv.DiemToan = Convert.ToDouble(Console.ReadLine());

            Console.Write("Nhap diem ly: ");

            sv.DiemLy = Convert.ToDouble(Console.ReadLine());

            Console.Write("Nhap diem hoa: ");

            sv.DiemHoa = Convert.ToDouble(Console.ReadLine());

            TinhDTB(sv);

            XepLoaiHocLuc(sv);

            ListSinhVien.Add(sv);

        }

        public void UpdateSinhVien(int ID)

        {

                        SinhVien sv = FindByID(ID);

            if (sv != null)

            {

                Console.Write("Nhap ten sinh vien: ");

                string name = Convert.ToString(Console.ReadLine());

                if (name != null && name.Length > 0)

                {

                    sv.Name = name;

                }

                Console.Write("Nhap gioi tinh sinh vien: ");

                                string sex = Convert.ToString(Console.ReadLine());

                if (sex != null && sex.Length > 0)

                {

                    sv.Sex = sex;

                }

                Console.Write("Nhap tuoi sinh vien: ");

                string ageStr = Convert.ToString(Console.ReadLine());

                if (ageStr != null && ageStr.Length > 0)

                {

                    sv.Age = Convert.ToInt32(ageStr);

                }

                Console.Write("Nhap diem toan: ");

                string diemToanStr = Convert.ToString(Console.ReadLine());

                if (diemToanStr != null && diemToanStr.Length > 0)

                {

                    sv.DiemToan = Convert.ToDouble(diemToanStr);

                }

                Console.Write("Nhap diem ly: ");

                string diemLyStr = Convert.ToString(Console.ReadLine());

                // Nếu không nhập gì thì không cập nhật điểm lý

                if (diemLyStr != null && diemLyStr.Length > 0)

                {

                    sv.DiemLy = Convert.ToDouble(diemLyStr);

                }

                Console.Write("Nhap diem hoa: ");

                string diemHoaStr = Convert.ToString(Console.ReadLine());

                if (diemHoaStr != null && diemHoaStr.Length > 0)

                {

                    sv.DiemHoa = Convert.ToDouble(diemHoaStr);

                }

                TinhDTB(sv);

                XepLoaiHocLuc(sv);

            }

            else

            {

                Console.WriteLine("Sinh vien co ID = {0} khong ton tai.", ID);

            }

        }

        public void SortByID()

        {

            ListSinhVien.Sort(delegate (SinhVien sv1, SinhVien sv2) {

                return sv1.ID.CompareTo(sv2.ID);

            });

        }

        public void SortByName()

        {

            ListSinhVien.Sort(delegate (SinhVien sv1, SinhVien sv2) {

                return sv1.Name.CompareTo(sv2.Name);

            });

        }

        public void SortByDiemTB()

        {

            ListSinhVien.Sort(delegate (SinhVien sv1, SinhVien sv2) {

                return sv1.DiemTB.CompareTo(sv2.DiemTB);

            });

        }

        public SinhVien FindByID(int ID)

        {

            SinhVien searchResult = null;

            if (ListSinhVien != null && ListSinhVien.Count > 0)

            {

                foreach (SinhVien sv in ListSinhVien)

                {

                    if (sv.ID == ID)

                    {

                        searchResult = sv;

                    }

                }

            }

            return searchResult;

        }

        public List<SinhVien> FindByName(String keyword)

        {

            List<SinhVien> searchResult = new List<SinhVien>();

            if (ListSinhVien != null && ListSinhVien.Count > 0)

            {

                foreach (SinhVien sv in ListSinhVien)

                {

                    if (sv.Name.ToUpper().Contains(keyword.ToUpper()))

                    {

                        searchResult.Add(sv);

                    }

                }

            }

            return searchResult;

        }

        public bool DeleteById(int ID)

        {

            bool IsDeleted = false;

            SinhVien sv = FindByID(ID);

            if (sv != null)

            {

                IsDeleted = ListSinhVien.Remove(sv);

            }

            return IsDeleted;

        }

        private void TinhDTB(SinhVien sv)

        {

            double DiemTB = (sv.DiemToan + sv.DiemLy + sv.DiemHoa) / 3;

            sv.DiemTB = Math.Round(DiemTB, 2, MidpointRounding.AwayFromZero);

        }

        private void XepLoaiHocLuc(SinhVien sv)

        {

            if (sv.DiemTB >= 8)

            {

                sv.HocLuc = "Gioi";

            }

            else if (sv.DiemTB >= 6.5)

            {

                sv.HocLuc = "Kha";

            }

            else if (sv.DiemTB >= 5)

            {

                sv.HocLuc = "Trung Binh";

            }

            else

            {

                sv.HocLuc = "Yeu";

            }

        }

        public void ShowSinhVien(List<SinhVien> listSV)

        {

            Console.WriteLine("{0, -5} {1, -20} {2, -5} {3, 5} {4, 5} {5, 5} {6, 5} {7, 10} {8, 10}",

                  "ID", "Name", "Sex", "Age", "Toan", "Ly", "Hoa", "Diem TB", "Hoc Luc");

            if (listSV != null && listSV.Count > 0)

            {

                foreach (SinhVien sv in listSV)

                {

                    Console.WriteLine("{0, -5} {1, -20} {2, -5} {3, 5} {4, 5} {5, 5} {6, 5} {7, 10} {8, 10}",

                                      sv.ID, sv.Name, sv.Sex, sv.Age, sv.DiemToan, sv.DiemLy, sv.DiemHoa,

                                      sv.DiemTB, sv.HocLuc);

                }

            }

            Console.WriteLine();

        }

        public List<SinhVien> getListSinhVien()

        {

            return ListSinhVien;

        }

    }

}

**Hàm main:**

using System;

using System.Collections.Generic;

namespace BaiTapQLSV

{

    class Program

    {

        static void Main(string[] args)

        {

            QuanLySinhVien quanLySinhVien = new QuanLySinhVien();

            while (true)

            {

                Console.WriteLine("\nCHUONG TRINH QUAN LY SINH VIEN C#");

                Console.WriteLine("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*MENU\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*");

                Console.WriteLine("\*\*  1. Them sinh vien.                               \*\*");

                Console.WriteLine("\*\*  2. Cap nhat thong tin sinh vien boi ID.          \*\*");

                Console.WriteLine("\*\*  3. Xoa sinh vien boi ID.                         \*\*");

                Console.WriteLine("\*\*  4. Tim kiem sinh vien theo ten.                  \*\*");

                Console.WriteLine("\*\*  5. Sap xep sinh vien theo diem trung binh (GPA). \*\*");

                Console.WriteLine("\*\*  6. Sap xep sinh vien theo ten.                   \*\*");

                Console.WriteLine("\*\*  7. Sap xep sinh vien theo ID.                    \*\*");

                Console.WriteLine("\*\*  8. Hien thi danh sach sinh vien.                 \*\*");

                Console.WriteLine("\*\*  0. Thoat                                         \*\*");

                Console.WriteLine("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*");

                Console.Write("Nhap tuy chon: ");

                int key = Convert.ToInt32(Console.ReadLine());

                switch (key)

                {

                    case 1:

                        Console.WriteLine("\n1. Them sinh vien.");

                        quanLySinhVien.NhapSinhVien();

                        Console.WriteLine("\nThem sinh vien thanh cong!");

                        break;

                    case 2:

                        if (quanLySinhVien.SoLuongSinhVien() > 0)

                        {

                            int id;

                            Console.WriteLine("\n2. Cap nhat thong tin sinh vien. ");

                            Console.Write("\nNhap ID: ");

                            id = Convert.ToInt32(Console.ReadLine());

                            quanLySinhVien.UpdateSinhVien(id);

                        }

                        else

                        {

                            Console.WriteLine("\nSanh sach sinh vien trong!");

                        }

                        break;

                    case 3:

                        if (quanLySinhVien.SoLuongSinhVien() > 0)

                        {

                            int id;

                            Console.WriteLine("\n3. Xoa sinh vien.");

                            Console.Write("\nNhap ID: ");

                            id = Convert.ToInt32(Console.ReadLine());

                            if (quanLySinhVien.DeleteById(id))

                            {

                                Console.WriteLine("\nSinh vien co id = {0} da bi xoa.", id);

                            }

                        }

                        else

                        {

                            Console.WriteLine("\nSanh sach sinh vien trong!");

                        }

                        break;

                    case 4:

                        if (quanLySinhVien.SoLuongSinhVien() > 0)

                        {

                            Console.WriteLine("\n4. Tim kiem sinh vien theo ten.");

                            Console.Write("\nNhap ten de tim kiem: ");

                            string name = Convert.ToString(Console.ReadLine());

                            List<SinhVien> searchResult = quanLySinhVien.FindByName(name);

                            quanLySinhVien.ShowSinhVien(searchResult);

                        }

                        else

                        {

                            Console.WriteLine("\nSanh sach sinh vien trong!");

                        }

                        break;

                    case 5:

                        if (quanLySinhVien.SoLuongSinhVien() > 0)

                        {

                            Console.WriteLine("\n5. Sap xep sinh vien theo diem trung binh (GPA).");

                            quanLySinhVien.SortByDiemTB();

                            quanLySinhVien.ShowSinhVien(quanLySinhVien.getListSinhVien());

                        }

                        else

                        {

                            Console.WriteLine("\nSanh sach sinh vien trong!");

                        }

                        break;

                    case 6:

                        if (quanLySinhVien.SoLuongSinhVien() > 0)

                        {

                            Console.WriteLine("\n6. Sap xep sinh vien theo ten.");

                            quanLySinhVien.SortByName();

                            quanLySinhVien.ShowSinhVien(quanLySinhVien.getListSinhVien());

                        }

                        else

                        {

                            Console.WriteLine("\nSanh sach sinh vien trong!");

                        }

                        break;

                    case 7:

                        if (quanLySinhVien.SoLuongSinhVien() > 0)

                        {

                            Console.WriteLine("\n6. Sap xep sinh vien theo ID.");

                            quanLySinhVien.SortByID();

                            quanLySinhVien.ShowSinhVien(quanLySinhVien.getListSinhVien());

                        }

                        else

                        {

                            Console.WriteLine("\nSanh sach sinh vien trong!");

                        }

                        break;

                    case 8:

                        if (quanLySinhVien.SoLuongSinhVien() > 0)

                        {

                            Console.WriteLine("\n7. Hien thi danh sach sinh vien.");

                            quanLySinhVien.ShowSinhVien(quanLySinhVien.getListSinhVien());

                        }

                        else

                        {

                            Console.WriteLine("\nSanh sach sinh vien trong!");

                        }

                        break;

                    case 0:

                        Console.WriteLine("\nBan da chon thoat chuong trinh!");

                        return;

                    default:

                        Console.WriteLine("\nKhong co chuc nang nay!");

                        Console.WriteLine("\nHay chon chuc nang trong hop menu.");

                        break;

                }

            }

        }

    }

}