1. (40 points) Extend the program below so that the movies are sorted, line #31, and printed, line #32. You may add code to the program, but you may not modify existing code.

```
1  #include <iostream>
2  #include <string>
3  #include <vector>
4  #include <algorithm>
5
6  class Movie {
7  public:
8    Movie(const std::string&  t) : title(t) { }
9    const std::string getTitle() const { return title; }
10 private:
11   std::string title;
12 };
13 std::ostream& operator<<(std::ostream& out, const Movie& m) {
14   return out << m.getTitle();
15 }
16
17 class MovieTitles {
18 public:
19   MovieTitles() : titles() {}
20   void addTitle(const std::string& t) { titles.push_back(t); }
21 private:
22   std::vector<Movie> titles;
23 };
24
25 int main() {
26   MovieTitles titles;
27   titles.addTitle("Scream");
28   titles.addTitle("Carrie");
29   titles.addTitle("A Nightmare on Elm Street");
30   titles.addTitle("Beetlejuice");
31   // sort the movies
32   // print the movie titles;
33 }
```

2. (40 points) Extend the program below so that the movies are sorted, line #31, and printed, line #32. You may add code to the program, but you may not modify existing code.

```
1  #include <iostream>
2  #include <string>
3  #include <list>
4  #include <algorithm>
5
6  class Pokemon {
7  public:
8    Pokemon(const std::string&  t) : type(t) { }
9    const std::string getType() const { return type; }
10 private:
11   std::string type;
12 };
13 std::ostream& operator<<(std::ostream& out, const Pokemon* m) {
14   return out << m->getType();
15 }
16
17 class Pokedex {
18 public:
19   Pokedex() : types() {}
20   void addPokemon(const std::string& t) { types.push_back(new Pokemon(t)); }
21 private:
22   std::list<Pokemon*> types;
23 };
24
25 int main() {
26   Pokedex pokes;
27   pokes.addPokemon("Snorlax");
28   pokes.addPokemon("Lapras");
29   pokes.addPokemon("Gyarados");
30   pokes.addPokemon("Rapidash");
31   // sort the pokemon
32   // print the pokemon
33 }
```

3. (20 points) Write the missing print function used on line #13. Then, give the output for the following program, assuming your print function works.

```
1  #include <iostream>
2  #include <string>
3  #include <map>
4
5  int main() {
6    std::map<std::string, int> pokedex;
7    pokedex["Snorlax"] = 2345;
8    pokedex["Aerodactyl"] = 1990;
9    pokedex["Abra"] = 234;
10   pokedex["Aerodactyl"] = 747;
11   std::cout << pokedex["Abra"] << std::endl;
12   std::cout << pokedex["Charizard"] << std::endl;
13   print(pokedex);
14   std::cout << pokedex.size() << std::endl;
15 }
```