Read and trace the following code, and answer the following questions.

```cpp
#include <iostream>
#include <string>
using namespace std;

class Garage
{
private:
    int num_car; // num of cars
    string* cars; // an array of car names
public:
    Garage();
    Garage(int);
    // Big three
    ~Garage();
    Garage(const Garage&);
    Garage& operator=(const Garage&);
    // Other member functions
    Garage (int n);
    void fun1();
    void fun2(Garage);
    Garage& fun3(Garage&);
};

Garage::Garage()
{
    cout << "Garage()" << endl;
    this->num_car = 0;
    this->cars = NULL;
}

Garage::Garage(int n)
{
    cout << "Garage(int)" << endl;
    this->num_car = n;
    this->cars = new string[n];
}

// Implementation of the big three
Garage::~Garage()
{
    cout << "~Garage()" << endl;
    if (this->cars != NULL)
    {
        delete [] this->cars;
        this->cars = NULL;
    }
}

Garage::Garage(const Garage& g)
{
    cout << "CC" << endl;
    this->num_car = g.num_car;
    this->cars = new string[this->num_car];
    for (int i = 0; i < this->num_car; ++i)
    {
        this->cars[i] = g.cars[i];
    }
}

Garage& Garage::operator=(const Garage& g)
{
    cout << "A00" << endl;
    if (this == &g)
    return *this;

    if (this->cars != NULL)
    delete [] this->cars;

    this->num_car = g.num_car;
    this->cars = new string[this->num_car];
    for (int i = 0; i < this->num_car; ++i)
    {
        this->cars[i] = g.cars[i];
    }
    return *this;
}

void Garage::fun2(Garage g)
{
    cout << "2" << endl;
    // ...some code
}

void Garage::fun1()
{
    cout << "1" << endl;
    Garage temp;
    // ...some code
    return temp;
}

Garage Garage::fun3 (Garage & g)
{
    cout << "3" << endl;
    // ...some code
    return g;
}

int main()
{
    Garage g1;
    Garage g2(5);
    Garage g3 = g2;
    g1 = g2;
    g1 = g2.fun1();
    g3.fun2(g1);
    g1.fun3(g2);
    return 0;
}
```
1. For line 12 and 13, which one is the default constructor, and which one is the non-default constructor?

2. Label the big three from line 16-18. Options: Copy constructor, Assignment Operator Overload, Destructor

3. Explain the difference between shallow copy and deep copy.

4. Which parts within the big three functions implement the deep copy?

5. What is the purpose of line 59-60?

6. What is the purpose of line 62-63?

7. What is the output of line 96-99?

8. What is the output of line 101?

9. What is the output of line 103?
10. What is the output of line 105?

11. What is the output after line 108?

12. When would each of the big three functions be called?

13. From your answers above, what is the most efficient way to pass an object into a function?