Sample C++ Questions from Old Exams

1. What is the difference between private and protected class members.

2. What is “this”. Give an example of when you would use “this”

3. What are the initialization and the assignment phases of a constructor? What is each used for?

4. Having a pointer as a class data member can lead to some undesirable side effects. What should you add to a class to avoid these side effects?

Each of the following programs illustrates one or more concepts or issues in C++. What is/are those issues? What is the result of compiling and running each program? (Some programs may not compile.) Explain your answer. Assume iostream and namespace std are included in each program. Any minor syntax errors are typos.

5a)

```
void you( long a,  long b) {cout << "long";}
void you( double a, double b) {cout << "double";}

int main(){
        int a, b;
        you( a, b );
}
```

5b)

```
int main(){
        const  char*  what  =  "Is This";
        what = "Interesting";
        cout << *what;
        what[3] = 'a';
        cout << *what;
}
```

6a)

```
int& Now()  {
        int Where = 1;
        return Where ;
}

int main() {
        int Where;
        Where= Now();
        cout << Where;
}
```

6b)

```
class Where {
        public:
                int here;

                int foo() const;
                int bar() const;
};

int Where ::foo() const {
        here = here + 5;
        return here;
}

int Where ::bar() const {
        return here + 5;
}

int OhNo(const Where* Now) {
        return Now->bar();
}


int main(){
        Where* IsIt = new Where;
        cout << OhNo(IsIt);
};
```

7a)

```
class Top {
public:
	int a;
	Top(int x) { a = x;}
};

class Bottom : public Top {
public:
	int b;
	Bottom() : Top(5) { b = 0; a = 0;}
};


int main() {
	Bottom barrel;
	cout << barrel.a <<"\n" << barrel.b;
}
```

7b)

```
class Top
{
	public:
		void Hat(char *string) {	cout << "Top";}
		void Hat(float a) {	cout << "Top Too";}
};

class Bottom :  public Top
{
	public:
		void Hat(const int a) {		cout << "Bottom";}
		void Hat(float a) {	cout << "Bottom Too";}
};

int main(){
	Bottom* Rung;
	Rung->Hat(5.5);
	Rung->Hat("cat");}
```

8.

```
class Top
{       public:
        Top() { cout << "Start Top\n";}
        ~Top() { cout << "End Top\n";}
};

class Bottom : public Top
{       public:
        Bottom() { cout << "Start Bottom\n";}
        ~Bottom() { cout << "End Bottom\n";}
};

class Test
{       public:
        Bottom deal;
        Test() { cout << "Start Test\n";}
};

int main(){
        Test me;
}
```

1. Give the output of the following program.

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

class Top {
public:
        virtual void MyMemory() { cout << "I forget" << endl;};
        void Disk()    { cout << "Space" << endl;};
        void Erased()          { cout << "For good" << endl;};
        void ThisExam()      { Erased(); MyMemory(); };
        virtual ~Top() {}
};

class Bottom : public Top {
public:
        void MyMemory()    { cout << "Gone" << endl;};
        void Disk()             { cout << "Slipped" << endl;};
        void virtual Erased()          { cout << "Rubbed out" << endl;};
};

int main()
{
        Top* Hat = new Bottom;
        Hat->MyMemory();
        Hat->Disk();
        Hat->ThisExam();

        Top Dog = *(new Bottom);
        Dog.MyMemory();
        Dog.Disk();
        Dog.ThisExam();
}
```

2. List the different ways to implement implicit type conversion in a class.

2) If a class has a pointer as a data member, what items should be part of the class to prevent various pointer problems.

3) a) True or False. A copy constructor does not have initialization phase.

b) Give two different types of items that must be initialized in the initialization phase of a constructor.

5) a) How do the variables A and B differ?

```
char  *const  A  =  "Hi";
const  char*  B  =  "Hi";
```

b) Explain the problems with the following uses of C and D

```
const  char*  C  =  "hi mom";
C[3] = 'a';

char  *const  D  =  "hi mom";
D = "hi dad";
```

What is the output of the following programs?

7)

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

void functionA( int X, double Y) { cout << "First function\n";};

void functionA( char X, float Y ) { cout << "Second function\n";};

int main() {
        char Me = 'a';
        int You = 5;
        functionA( Me, You );
}
```

8)

```
#include <iostream.h>

class Container {
        public:
                int value;

                Container( int amount ) { value = amount;
                                          cout << "Value " << value << endl; };

                ~Container() { cout << " You just killed: " << value << endl; };
};

class ExamQuestion {
        public :
                Container data;

                ExamQuestion(int A) : data(A) { cout << "New Object\n";};

                ExamQuestion( const ExamQuestion& X ) : data(X.data.value + 10)
                                                        { cout << "Special\n"; };
};

void TrickyPart(ExamQuestion why){
        ExamQuestion PartB = why;
        cout << "After PartB\n";
}

int main(){
        ExamQuestion Answer(1);
        cout << "Call TrickyPart\n";

        TrickyPart(Answer);
        cout << "end" << endl;
}
```

What is the result of compiling and running (if they compile) the following programs.

9)

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

class Test {
	private :
		float data;

	public :
		void setData( int& value) { data = value;};

		static float getData()   { return data;};

		Test( int value ) : data( value ) {};
};

int main(){
	Test me = 10.5;
	cout << me.getData() << endl;
}
```

10)

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

int A = 10;

float functionB( int A, char B = 5, float C ) {
	return ::A + B + C;
}


int main() {
	int A = 2;
	float X = 11.1;
	cout << functionB( A, X );
}
```