Question 1

```cpp
int main()
{
    for(int i=1; i<=10; i++) {
        cout << "Hello world!" << endl;
    }
    return 0;
}
```

Question 2

```cpp
int main()
{
    const int max = sizeof(int) * 8;
    int nb = 1;

    for(int i=1; i<max; i++) {
        cout << nb << endl;
        nb <<= 1;
    }
    return 0;
}
```

Question 3

```cpp
int sumDouble(int a, int b)
{
    if(a == b) return 4*a;
    else return a+b;
}

int main()
{
    cout << "sumDouble(1, 2) = " << sumDouble(1, 2) << endl; // 3
    cout << "sumDouble(3, 2) = " << sumDouble(3, 2) << endl; // 5
    cout << "sumDouble(2, 2) = " << sumDouble(2, 2) << endl; // 8

    return 0;
}
```

Question 4

```cpp
string helloName(string s)
{
    return "Hello " + s + "!";
}

int main()
{
    cout << "helloName(\"Bob\") = " << helloName("Bob") << endl;
    return 0;
}
```

Question 5

```cpp
void helloName(string &s)
{
    s = "Hello " + s + "!";
}

int main()
{
    string test_bob = "Bob";

    cout << "before, test_bob = " << test_bob << endl;
    helloName(test_bob);
    cout << "after, test_bob = " << test_bob << endl;

    return 0;
}
```

Question 6

```cpp
bool monkeyTrouble(bool monkey1, bool monkey2)
{
    return (monkey1 == monkey2);
}

int main()
{
    cout << "(true, true) => " << monkeyTrouble(true, true) << endl; // true
    cout << "(false, false) => " << monkeyTrouble(false, false) << endl; // true
    cout << "(true, false) => " << monkeyTrouble(true, false) << endl; // false

    return 0;
}
```

Question 7

```cpp
int main()
{
    string exemple = "Always code as if the guy who ends up maintaining your
code will be a violent psychopath who knows where you live.";

    int found_position = exemple.find(" you ");
    cout << "'you' found at carac " << int(found_position) << endl;

    exemple.replace(found_position, 4, " YOU");
    cout << "exemple = " << exemple << endl;

    return 0;
}
```

Question 8

```cpp
class Monkey {

protected:
    bool happy;

public:
    void display() {
        if(happy) cout << "this monkey is happy" << endl;
        else cout << "this monkey is sad" << endl;
    }

    void feed() {
        this->happy = true;
    }

    void tickle() {
        this->happy = false;
    }
};


int main()
{
    // we create 2 monkeys, jack & john
    Monkey jack, john;

    // after this block, jack is happy and john sad
    jack.feed();
    john.tickle();
    jack.display(); john.display();

    // after this block, john will be happy and jack sad
    john.feed();
    jack.tickle();
    jack.display(); john.display();

    // after this block, john and are both happy
    jack.feed();
    jack.display(); john.display();

    // endly, after this block john and jack are both sad
    jack.tickle();
    john.tickle();
    jack.display(); john.display();
}
```

Question 9

In the monkey class, we have to add a public method :

```cpp
void shake() {
        this->happy = ! this->happy;
    }
```

Question 10

```cpp
class Monkey {

protected:
    string name;
    bool happy;

public:
    Monkey(string name_, bool happy_) : name(name_), happy(happy_) {

    }

    void display() {
        if(this->happy) cout << this->name << " is happy" << endl;
        else cout << this->name << " is sad" << endl;
    }

    void feed() {
        this->happy = true;
    }

    void tickle() {
        this->happy = false;
    }

    void shake() {
        this->happy = ! this->happy;
    }
};


int main()
{
    // we create 2 monkeys, jack & john
    Monkey* jack = new Monkey("jack", true);
    Monkey* john = new Monkey("john", false);

    jack->display(); john->display();
}
```