The Impossible Procedure

Winston is Desperate

Winston's working late. Lots of coffee. Trying to find why a program is sometimes hanging. Eventually, encounters a stranger in Starbucks. The stranger offers Winston some code that determines whether particular code halts on particular input. And works for ALL cases. Winston is desperate. . .

Mocha

Winston buys it.

Michelle's outstanding code halting analyzer

```
// returns true if CODE halts on INPUT
bool Mocha ( string CODE, string INPUT )
{
   ...
   ...
}
```

The Test

Next day, Winston tells a colleague about the software they bought. The colleague expresses doubts. Says, here is some test code, WID.cpp.

```
void WID( string arg )
{
   ...
}
```

Mocha says Yes

Winston runs the test through Mocha. Of course, Winston needs some input to the test. Colleague says just use the same file as a string.

Mocha says Yes: WID halts on the specified input.

Colleague says. Well, run WID and see. And Winston sees stars

*The *** Test*

Colleague shows Winston the test.

```
void WID( string arg )
{
  if( Mocha( arg, arg ) ) {
      while( true ) cout << "*";
   }
}
```

Mocha Said Yes

Since Mocha said yes, WID goes on forever.

```
void WID( string arg )
{
  if( Mocha( arg, arg ) ) {
      while( true ) cout << "*";
   }
}
```

But, Mocha was provided WID.cpp and said that that code with input file WID.cpp halted.

Mocha Lied

So actually, WID.cpp when provided the input file WID.cpp does not halt.

Mocha Has to Lie

But if Mocha said No, meaning Mocha claims that WID does not halt, then the condition in WID is not true, and WID does halt.

That is, WID.cpp halts on WID.cpp if and only if Mocha says it does not.

Conclusion

Mocha is fake. . .