CS 261 – Data Structures

Preconditions, Postconditions & Assert

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Preconditions

preconditions are input conditions for the function

```
/*
  pre: size < SIZELIMIT
  pre: name != null;
  post:  result >= MINRESULT
*/
int magic (int size, char *name)
{
        assert(size < SIZELIMIT);
        assert(name != null)
        … DO STUFF …
        assert(result >= MINRESULT);
        return result;
}
```

1. magic is only required to do it's task if pre-conditions are satisfied
2. The caller knows that ***if he satisfies*** those conditions, magic will perform the task correctly

Postconditions

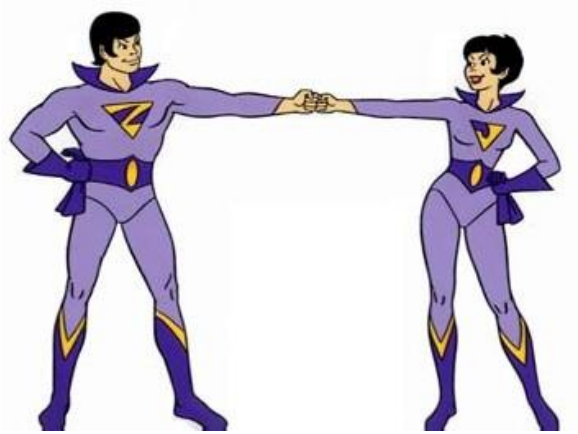
postconditions are output conditions for a function

```
/*
  pre: size < SIZELIMIT
  pre: name != null;
  post:  result >= MINRESULT
*/
int magic (int size, char *name)
{
        assert(size < SIZELIMIT);
        assert(name != null)
        … DO STUFF …
        assert(result >= MINRESULT);
        return result;
}
```

1. magic guarantees the condition will hold when it completes. As developer, you must ensure this!
2. The caller is certain of what it will get , provided it has met preconditions

Pre-conditions + Post-conditions

When combined….they define a contract!!!



pre post

Using pre and post conditions and CHECKING them helps you find and remove bugs and fulfill the contract!

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In practice….

- put pre-conditions in the header
- put post-conditions in the header
- during debugging, use ***asserts()*** to enforce them

To catch errors when recovery is generally not immediately possible

Useful during debugging, but we should replace for “Release”

Bugs and Errors

1. Program Error: a bug, and should never occur

   Replace these asserts with a reasonable error message

2. Run-time Error: can validly occur at any time during execution (e.g. user input is illegal) and should be recoverable

   Write recovery code for these kinds of errors