

CS221  
C and Systems  
Programming



# A program's environment

"System variables"

System variables used to configure a computer's and computer user's environment

Maintained by the Operating System

run "printenv"

# A program's environment

Interesting variables in the environment

- **PATH**
- **SHELL**
- **NUMBER\_OF\_PROCESSORS**
- **USER, USERNAME, NAME**

Set a variable in bash via

- **NewVar=NewValue**
- **export NewVar**

"shell variables" are a superset of "environment variables" (run 'set').  
Good to set important environment (and shell) variables in .bashrc

## How can our programs read the environment?

```
int main(int argc, char** argv, char** envp) {
```

We can read the environment to see if we should customize our program's behavior.

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4

envp is a 0-terminated list of strings

look at "showenv.c"

CODE-ALONG: look for USER, USERNAME and print "Hi <<name>>" for the first one found.

## A simpler way...

```
getenv()
```

```
putenv()
```

...but there's a problem with `putenv()`

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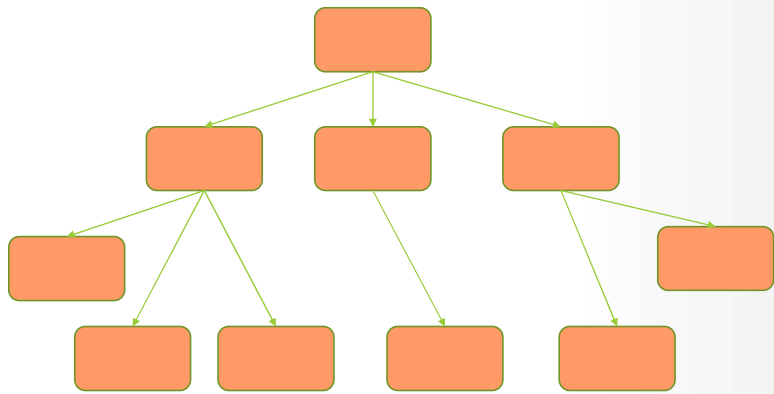
5

Can change enviro for running program, but not for surrounding shell enviro!

Modify `showenv.c` to set `USER` to "Sparky"

There is no workaround. This is a limitation of "the environment"

## C trees



## Let's do some more practice

How to make a binary tree?

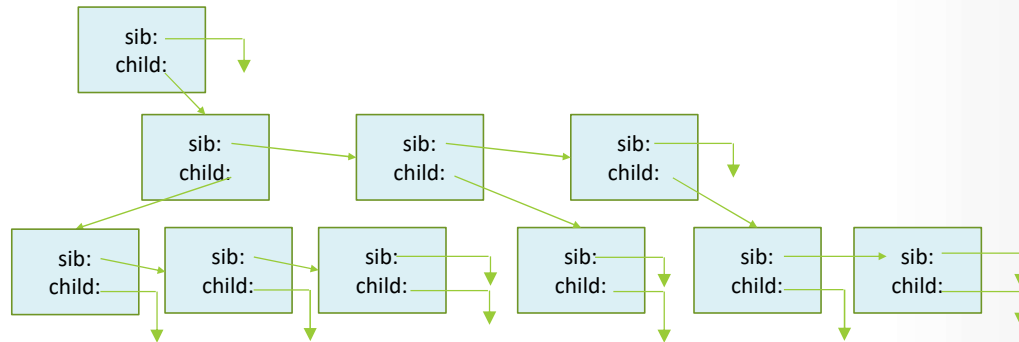
Each tree node needs two children

Do we need separate structs for `TreeNode` and `Tree`?

Codealong: `BinTree.c`. Students finish missing code

## Non-binary tree

```
struct TreeNode {  
    char value[256];  
    TreeNode* nextSibling;  
    TreeNode* firstChild;  
};
```



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8

I give you:

- the struct and helper methods. main() method
- Store "animal taxonomy" e.g. Mammal:Canid:Wolf
- Don't store duplicates!
- CODE-ALONG: Print the tree. Free memory. TEST