Visitor Design Pattern

Visitor Design Pattern

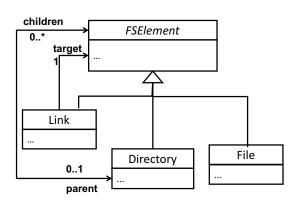
Intent

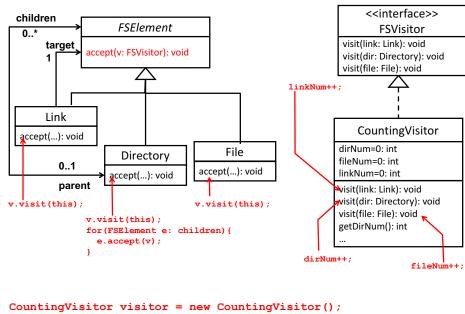
3

 Decouple a set of objects and the operations to be performed on those objects.

File System Examples (1/4)

 Counting the number of directories, the number of files and the number links in a file system

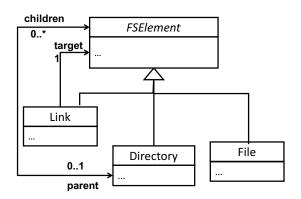




```
countingvisitor visitor = new Countingvisitor();
rootDir.accept( visitor );
visitor.getDirNum(); visitor.getFileNum(); visitor.getLinkNum();
```

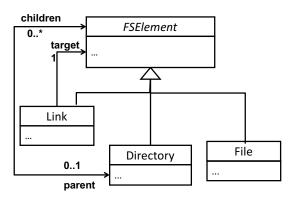
File System Examples (2/4)

Counting the total disk utilization in a file system



File System Examples (3/4)

- · Virus checking for each file
- File indexing



```
<<interface>>
 children
                       FSElement
                                                                              FSVisitor
  0..*
                                                                      visit(link: Link): void
                getDiskUtil(): int
                                                                      visit(dir: Directory): void
                 accept(v: FSVisitor): void
                                                                      visit(file: File): void
                                                          totalSize +
                                                            link.getDiskUtil();
                    return
       Link
                                   return 0
                                                                       SizeCountingVisitor
  getDiskUtil()
  accept(...): void
                                             File
                                                                     totalSize=0: int
                       Directory
          0..1
                                                                     visit(link: Link): void
                                        getDiskUtil()
                      getDiskUtil()
                                                                     visit(dir: Directory): void
                                        accept(...): void
                     accept(...): void
          parent
                                                                     visit(file: File): void
v.visit(this);
                                                                     getTotalSize(): int
                                       v.visit(this);
                v.visit(this);
                for(FSElement e: children) {
                                                                dir.getDiskUtil();
                  e.accept(v);
                                                                          totalSize +
                                                                            file.getDiskUtil();
SizeCountingVisitor visitor = new SizeCountingVisitor();
rootDir.accept( visitor );
visitor.getTotalSize();
```

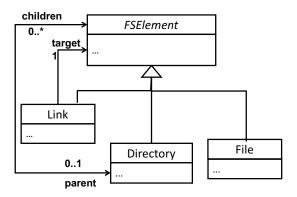
```
<<interface>>
 children
                       FSElement
                                                                             FSVisitor
  0..*
                                                                     visit(link: Link): void
       target
                accept(v: FSVisitor): void
                                                                     visit(dir: Directory): void
                                                                     visit(file: File): void
                                                             return:
      Link
                                                                      VirusCheckingVisitor
  accept(...): void
                                             File
                                                                    quarantined=0: int
                       Directory
          0..1
                                       accept(...): void
                                                                    visit(link: Link): void
                     accept(...): void
                                                                    visit(dir: Directory): void
           parent
                                                                    visit(file: File): void
v.visit(this);
                                      v.visit(this);
                                                                    getQuarantinedNum(): int
                v.visit(this);
                                                             return;
                for(FSElement e: children){
                  e.accept(v);
                                                                  Performs virus checking
                                                                  Quarantine the file if
                                                                  necessary;
                                                                  quarantined++;
VirusCheckingVisitor visitor = new VirusCheckingVisitor();
rootDir.accept( visitor );
```

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visitor.getQuarantinedNum();

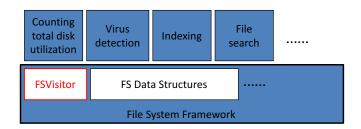
File System Examples (4/4)

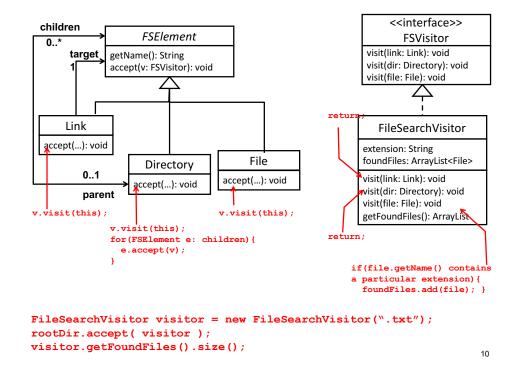
- File search
 - Searching/identifying files that have a particular extension
 - e.g., *.txt, *.jpg



What's the Point?

- Separating foundation data structures and the operations performed on those data structures.
 - It is easy to add, modify and remove operations.
 - Data structures can keep intact.



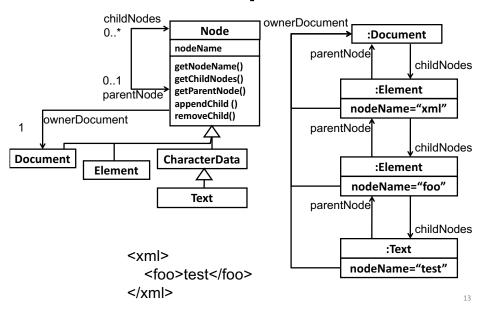


HW15

- Implement FSVisitor and three visitor classes.
 - You can choose which visitor classes to implement.

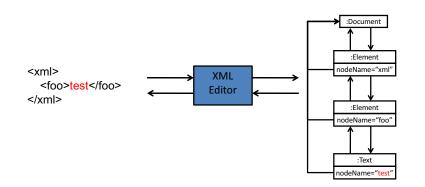
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Another Example with DOM

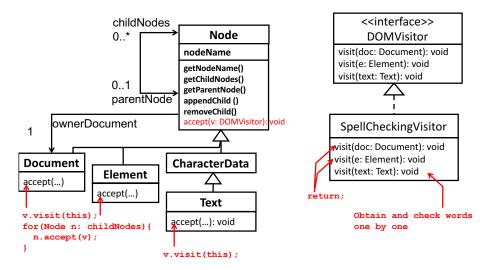


Spelling Checker in an XML Editor

- Imagine an XML editor that
 - Reads/imports an XML file, parses it and build its inmemory representation in DOM
 - Allows the user to check the spelling of each word in "Text" elements.

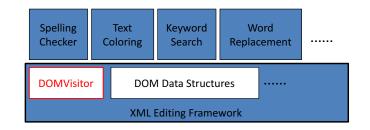


Spelling Checker as a Visitor



Other Potential Visitors

- · Many other visitors can be defined.
 - Any features/operations that are applied to a set of objects.



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Applicability of *Visitor*

- Visitor can be applied to any collection of objects, not limited to Composite-based tree structures.
 - List, graph, etc. etc.