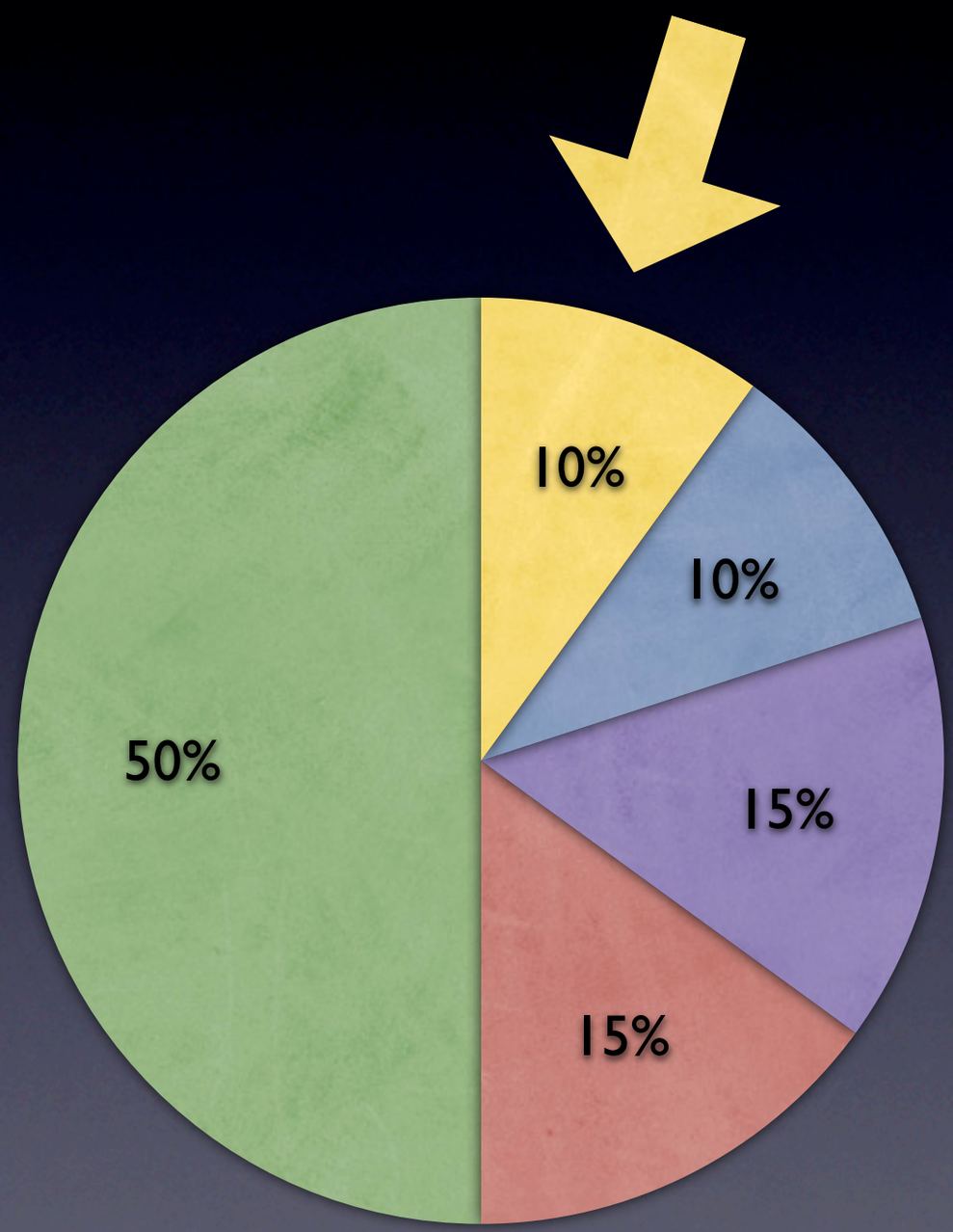
Project 1
Simplifying Input

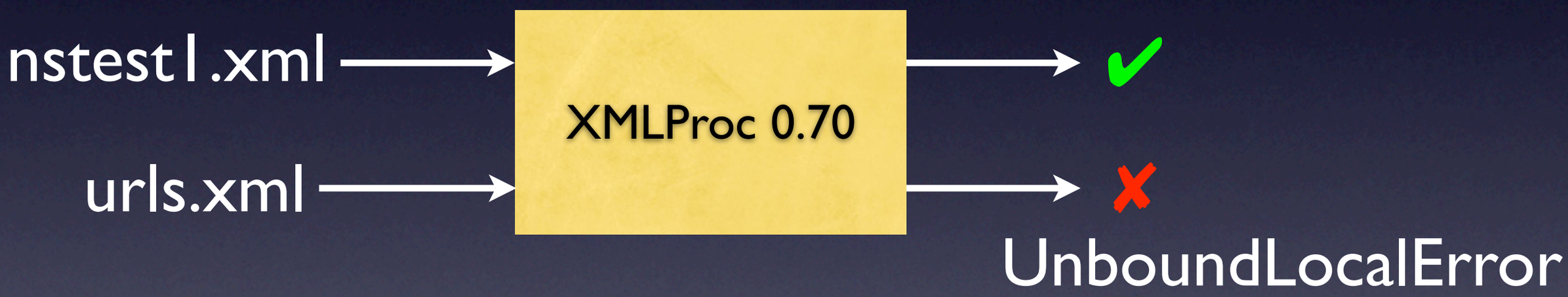
Andrzej Wasylkowski

Grading

- Project 1
- Project 2
- Project 3
- Project 4
- Oral Exam



Simplifying Input



Your task: use Delta Debugging to simplify demo.xml

Step 1
Write a testing function

- Invoke the XML parser
- Differentiate between three outcomes
  - Pass–without errors and warnings
  - Fail–the original failing outcome
  - Unresolved–another outcome (e.g., a syntax error)

Invoking the Parser

- Invoke directly from Python
- Try-except-else block differentiates between the outcomes

```
try:
  from xmlproc.xml.parsers.xmlproc import xmlproc
  p = xmlproc.XMLProcessor ()
  p.parse_resource (input_filename)
except UnboundLocalError as exc:
  # original failure
except:
  # some other failure
else:
  # parsing finished without errors
```

Step 2
Write a Splitting Function

- Write a split() function that splits input into subsets
- Just split the input into smallest parts (for example single characters)
- Use downloadable split() function

Step 3
Attach Delta Debugging

- You need listminus()
  - Download the listsets module
- You need ddmin()
  - Download the ddmin module
  - Hint: It comes with a test function

Step 4
Choose a Representation

- How do you represent the configuration that is to be minimized?
- You have to uniquely identify each circumstance (single character)

```
listminus(['d','e','f','e','c','t'], ['e']) =
  ['d','f','c','t']
```

Split a String into a List

- Split a string into a list of distinguishable characters
- Add an index to each character

```
char_list = []
for i in range (0, len (string)):
  char_list.append ((i, string[i]))
```

Step 5
Run it

- What is the simplified failure-inducing input in urls.xml?
- Record the number of tests that Delta Debugging needs

Step 6
Is it Documented?

- Be sure to have a docstring for each function

```
def string_to_list (s):
  """
  Splits a string into a list of
  distinguishable characters. Returns
  a list of pairs: (index, character).
  """
  char_list = []
  for i in range (0, len (s)):
    char_list.append ((i, s[i]))
  return char_list
```

Step 7
Improve Efficiency

- Add caching to the testing function
- Implement syntactic simplification
  - Use an XML parser to split the input along the XML structure
- Narrowing down the failure cause should be faster

Parsing XML Entities

- Use Expat parser to split XML into entities

```
import xml.parsers.expat

entities = []

def defaultHandler (data):
  entities.append (data)

p = xml.parsers.expat.ParserCreate ()
p.DefaultHandler = defaultHandler
f = file (filename, “r”)
p.ParseFile (f)
```

Step 8
Attach Interface

- Your tool should be runnable from the command line exactly as shown here:

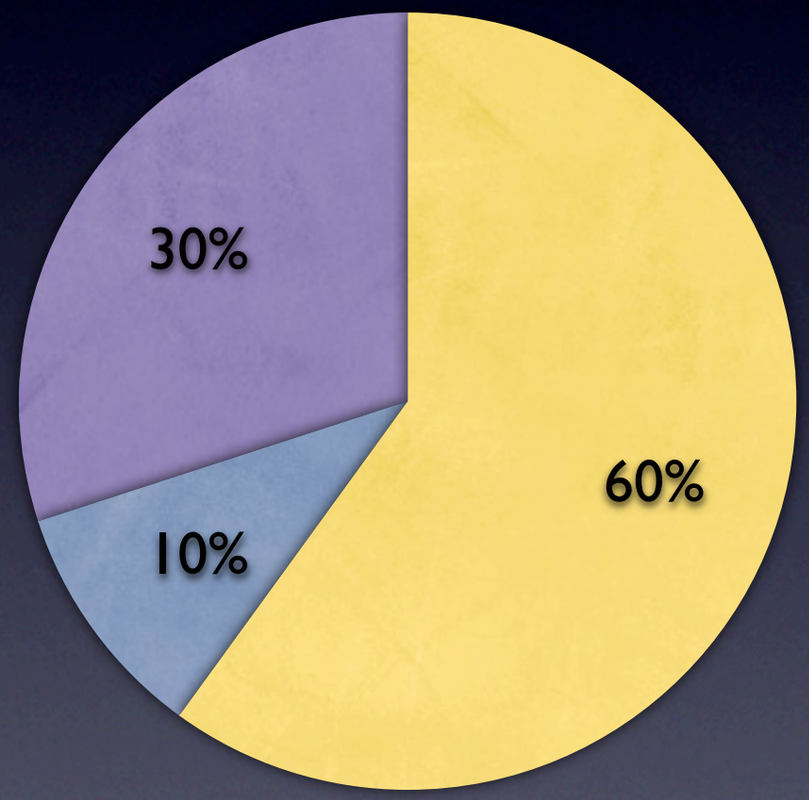
```
$ python yourtool.py xmlproc/demo/urls.xml
   Relevant input: …
   Tests performed: …
```

- Additional options for caching and XML parsing:

```
$ python yourtool.py -cache xmlproc/demo/urls.xml
…
$ python yourtool.py -xml xmlproc/demo/urls.xml
…
```

Project Grading

- Base version
- Caching
- XML parsing



Submission

- 2008-11-19 23:59
- Send .zip archive to:
  wasylkowski@st.cs.uni-sb.de
- Subject should start with [Project 1]
- Ready-to-run as prescribed and documented