Program Analysis and Testing
Exam 1 Review

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February 28, 2022

1 Python for PAT

1.1 Inspecting objects in python

Python objects can be inspected with a handful of built-in functions.

1.2 Magic functions

A *Magic Method* is a function (always beginning and ending with `__`, called a *dunderstore*). Examples are given in **??**.

1.3 Syntactic sugar

Syntactic Sugar is syntax within a programming language that is designed to make things easier to read or to express. For example, a function decorator can be used as shorthand for function composition:

```
@decorator
def func():
    # do whatever
```

is equivalent to

```
def func(args):
  # do whatever
func = decorator(func)
```

Other examples of syntactic sugar:

Compound inequalities:

function	description
`help`	Invoke the built-in help system
`type`	With one argument, return the type of an object
`dir`	Without arguments, return the list of names in the current local scope. With an argument, attempt to return a list of valid attributes for that object
`id`	Return the identity of an object. This is an integer which is guaranteed to be unique and constant for this object during its lifetime.
`getattr`	Return the value of the named attribute of object
`callable`	Return `True` if the object argument appears callable, `False` if not.

function	description
`__new__`	Called to create a new instance of class cls.
`__init__`	Called after the instance has been created (by `__new__()`), but before it is returned to the caller.
`__del__`	Called when the instance is about to be destroyed.
`__repr__`	Called by the `repr()` built-in function to compute the "official" string representation of an object
`__str__`	Called by `str(object)` and the built-in functions `format()` and `print()` to compute the "informal" or nicely printable string representation of an object.

expression	explanation
`.`	(Dot.) In the default mode, this matches any character except a newline. If the `DOTALL` flag has been specified, this matches any character including a newline.
`^`	(Caret.) Matches the start of the string, and in `MULTILINE` mode also matches immediately after each newline.
`$`	Matches the end of the string or just before the newline at the end of the string.

```
1 < x < 10
```

```
1 < x and x < 10
```

List comprehension:

```
arr = [x for x in range(10)]
```

```
arr = []
for x in range(10):
    arr.append(x)
```

1.4 Regular expression

A *regular expression* is a sequence of characters that specify a search pattern in text.

```
re.findall(r'\bf[a-z]*', 'which foot or hand fell fastest')
```

?? gives an outline of regular expression syntax.