

Scalars

What are scalars?
Creating scalar variables
Operating on scalars

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What are scalars?

- In Perl, a *scalar* is a singular piece of data, either a number or a string
- Some examples:
14
hello
5.64234
This sentence is a scalar!
<the entire text of the Programming Perl book>

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What are scalars?

- Perl treats numbers and strings nearly interchangeably
- If you use a string where Perl expects a number, it will use the string as a number, and vice versa. Examples later.

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Numbers

- Integers
5
745634
- Floating Point
5.2304
3.88e12
-56.3421

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Strings

- String *literals* are represented in a Perl program within quotes
`'hello!'`
`'Four score and seven years ago'`
`'What\'s for dinner?'`
- Everything within the single quotes is interpreted literally. Use `\` to represent `'` in your strings.

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Double-Quoted Strings

- To represent *control characters* within strings, use double-quotes instead.
`"Go Blazers!\n"`
`"Fran\tFabrizio"`
`"She said, \"Take me to your leader.\\""`
- There are lots of control characters and the `\` takes on a lot of power within double quotes. These are just the most common uses.

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Numbers <--> Strings

- Perl will convert strings to numbers when needed
`'35' + 4 # Equals 39`
`"16fran34" / " 8" # Equals 2`
`"tony" + 3 # Equals 3, non-numeric string converts to 0`
- Numbers to strings works as well
`"Y" . 2 . "K" # Equals "Y2K"`

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Operating on Scalars

- For numbers, all the usual *operators*
`+ - * / % **`
- For strings, we have
 - The concatenation operator
`"base" . "ball" # Equals "baseball"`
 - The repetition operator
`'ho' x 3 # 'hohoho'`
`3 x 3 # "333" Don't get fooled :-)`

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Scalar Variables

- Perl uses the \$ to indicate a scalar *variable*
\$name
\$return_value
\$aLengthyVariableName
- Variable names are case-sensitive, can contain alphanumeric and underscore characters, cannot start with a digit, and can be of any length

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Scalar Assignment

- \$day = 'Wednesday';
- \$grade = '95';
- \$bonus = 5;
- \$total = \$grade + \$bonus; # 100
- \$extra_credit = 10;
- \$total += \$extra_credit; # 110
- \$day .= ' afternoon'; # "Wednesday afternoon"

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String Interpolation

- When using double-quotes, not only does the \ become more powerful, but you can also perform *variable substitution*
\$day = "Wednesday";
\$phrase = "\$day night"; # Wednesday night
\$literal = '\$day night'; # \$day night

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String Interpolation 2

- When perl sees a \$ inside double-quotes, it tries to form the longest variable name possible
\$word = 'dog';
\$string = "The \$word barks."; # The dog barks
\$string = "Cats and \$words"; # Cats and

.... because \$words is not defined. Instead:

```
$string = "Cats and ${word}s"; # Cats and dogs
```

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String Interpolation 3

- Four ways to accomplish the same thing

```
$word = 'dog';  
$string = "Cats and ${word}s\n";  
$string = "Cats and $word" . "s\n";  
$string = "Cats and $word" . s . "\n";  
$string = "Cats and " . $word . "s\n";
```

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Comparing Scalars

- For numbers, you can use:
== != > < >= <=
- For strings, you can use:
eq ne gt lt ge le
- A very common Perl mistake:
'cat' == 'dog' # True, Perl makes both sides 0
'cat' eq 'dog' # False, what you meant to do

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undef

- If a scalar variable has not yet been assigned a value, it has the Perl special value *undef*
- undef behaves like 0 when used as a number and like an empty string when used as a string
5 + \$sum # equals 5
\$sum++;
5 + \$sum # equals 6
\$newstring .= "hello"; # \$newstring is "hello"

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Boolean Values

- Perl does not require or have a specific boolean data type
- The following evaluate to false
undef 0 '0' ''
- Everything else evaluates to true
- Use the ! to get the opposite of a boolean
(! \$done) # if \$done is 1, evaluates to 0

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Simple output

- print “Hello World!\n”;
- \$weather = 'rainy';
- print “It will be \$weather today.\n”;
- print “My name is “;
print “Fran”;
print “\n”;
- print “My name is ” . “Fran” . “\n”;

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The if Construct

- if (*some condition*) {
do this if condition is true
} else {
do this if condition is false
};
- if (\$name eq 'Fran') {
print “Hello Mr. Fabrizio\n”;
}

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The if Construct 2

- if (!\$finished) { print “Keep working!\n”; }
- if (\$pushups >= 30) {
print “Great job!\n”;
} elsif (\$pushups >= 20) {
print “Not too bad.\n”;
} else {
print “You'd better visit the new rec center.\n”;
}

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Simple input

- Use <STDIN>
 - The full explanation of this will occur in a later lecture
- print “Your name please: “;
\$name = <STDIN>;
print “Hello \$name!”;

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Simple input 2

- Note that `<STDIN>` grabs an entire line of input from standard input (typically the keyboard), including the newline character at the end
- The `chomp()` function is handy here
 - `$name = <STDIN>;`
`chomp $name;`
 - `chomp()` looks for and removes a trailing `\n`
 - Important to remember to remove it, otherwise it will mess up things like string comparisons