

SORTING

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WHAT CAN BE SORTED?

- Lists / arrays of numbers

ARRAY OF NUMBERS

```
my @numbers = (12, 4, 66, 7, 23, 5, 19);  
print join ",", @numbers; # Print comma-separated list  
print "\n";
```

Sort numerically vs. sort as characters

SYNTAX FOR SORT

```
my @numbers = (12, 4, 66, 7, 23, 5, 19);  
my @sort1 = sort {$a <=> $b} @numbers;  
print join ", ", @numbers;  
print "\n";
```

- sort SUBROUTINE ARRAY (no comma)
- Special variables \$a and \$b
- How to sort descending?

SORT ASCENDING VS DESCENDING

```
my @numbers = (12, 4, 66, 7, 23, 5, 19);  
my @sort1 = sort {$a <=> $b} @numbers;  
my @sort2 = sort {$b <=> $a} @numbers;  
print join ", ", @sort1;  
print join ", ", @sort2;
```


WHAT'S THE DIFFERENCE?

```
my @numbers = (12, 4, 66, 7, 23, 5, 19);  
my @sort1 = sort {$a <=> $b} @numbers;  
my @sortA = sort {$a cmp $b} @numbers;  
print join ", ", @sort1;  
print join ", ", @sortA;
```


WHAT CAN BE SORTED?

- Lists / arrays of numbers
- Lists / arrays of character strings

SORTING CHARACTER STRINGS

```
my @names = ("Leonardo", "Donatello", "Raphael", "Michaelangelo")
my @sortA = sort {$a cmp $b} @names;
my @sortB = sort {$b cmp $a} @names;
print join ", ", @sortA;
print join ", ", @sortB;
```


SORTING TABLES

Turtle	Pizza
Leonardo	Anchovies
Donatello	Tuna
Raphael	Pepperoni
Michaelangelo	Cheese

What kind of data structure should I use?

SORTING HASHES

```
my %tp = ( "Leonardo" => "Anchovies",  
          "Donatello" => "Tuna",  
          "Raphael" => "Pepperoni",  
          "Michaelangelo" => "Cheese");
```

File hash_template.pl

Which is the key, which is the value?

REVIEW: GETTING KEYS OF A HASH

Getting keys of a hash

```
my %tp = ( "Leonardo" => "Anchovies",  
          "Donatello" => "Tuna",  
          "Raphael" => "Pepperoni",  
          "Michaelangelo" => "Cheese");  
print join ", ", (keys %tp);
```

- What kind of variable is (keys %tp)?
- What order are they reported? (Try running a few times)

REVIEW: GETTING VALUES OF A HASH

You tell me....

SORT VALUES BY KEYS

- Get the keys
- Sort the keys
- For each key...
- Report the value

SORT VALUES BY KEYS

```
my %tp = ... # etc
foreach my $key (sort {$a cmp $b} keys %tp) {
    print $tp{$key};
    print ",";
}
```

Identify the steps

SORT KEYS BY VALUES

```
my %tp = ... # etc
foreach my $key (sort {$tp{$a} cmp $tp{$b}} keys %tp) {
    print $key
}
```

- Keys guaranteed to be unique
- Values are not

WHAT CAN BE SORTED? (SUMMARY)

- Lists / arrays of numbers
- Lists / arrays of character strings
- Hashes by keys
- Hashes by values

