

What is shell scripting good for?

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You can use them:

- ▶ To automate repeated tasks
- ▶ For jobs that require a lot of interaction with files
- ▶ To set up the environment for big, complicated programs
- ▶ When you need to stick a bunch of programs together into something useful
- ▶ To add customizations to your environment

A practical example `runit1.sh`

```
#!/bin/bash
```

```
fg++ *.cpp  
./a.out
```

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- ▶ `$@` All command line arguments except `$0`
- ▶ `$#` The number of command line arguments in `$@`

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- ▶ `for arg in $@` will NOT do what you want.

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And now, a brief message from our sponsors:

- ▶ Bash really likes splitting things up into words.
- ▶ `for arg in $@` will NOT do what you want.
- ▶ `for arg in "$@"` correctly handles args with spaces.
- ▶ In general, when using the value of a variable you don't control, it is wise to put `"` s around the variable.

A Spiffier Example `runit2.sh`

```
#!/bin/bash
```

```
fg++ *.cpp -o $1  
./a.out
```


Conditional Statements `if.sh`

```
#!/bin/bash
```

```
# Emit the appropriate greeting for various people
```

```
if [[ $1 = "Jeff" ]]; then
    echo "Hi, Jeff"
elif [[ $1 == "Maggie" ]]; then
    echo "Hello, Maggie"
elif [[ $1 == *.txt ]]; then
    echo "You're a text file, $1"
elif [ "$1" = "Stallman" ]; then
    echo "FREEDOM!"
else
    echo "Who in blazes are you?"
fi
```

Conditional Operators

- ▶ `[]` is shorthand for the `test` command.
- ▶ `[[]]` is a `bash` keyword.
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- ▶ `[]` is shorthand for the `test` command.
- ▶ `[[]]` is a `bash` keyword.
- ▶ `[]` works on most shells, but `[[]]` is less confusing.
- ▶ `(())` is another `bash` keyword. It does arithmetic.

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String Comparison Operators for `[[]]`

- ▶ `=` String equality OR pattern matching if the RHS is a pattern.
- ▶ `!=` String inequality.
- ▶ `<` The LHS sorts before the RHS.
- ▶ `>` The LHS sorts after the RHS.
- ▶ `-z` The string is empty (length is **zero**).
- ▶ `-n` The string is **not** empty.

Numeric Comparison Operators for `[[]]`

- ▶ `-eq` Numeric equality (e.g. `[[5 -eq 5]]`).
- ▶ `-ne` Numeric inequality.

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- ▶ `-eq` Numeric equality (e.g. `[[5 -eq 5]]`).
- ▶ `-ne` Numeric inequality.
- ▶ `-lt` Less than
- ▶ `-gt` Greater than
- ▶ `-le` Less than or equal to
- ▶ `-ge` Greater than or equal to

File Operators for `[[]]`

- ▶ `-e` True if the file exists (e.g. `[[-e story.txt]]`)
- ▶ `-f` True if the file is a regular file
- ▶ `-d` True if the file is a directory

There are a lot more file operators that deal with even fancier stuff.

General Operators for `[]`

- ▶ `&&` Logical AND
- ▶ `||` Logical OR
- ▶ `!` Logical NOT

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- ▶ `&&` Logical AND
- ▶ `||` Logical OR
- ▶ `!` Logical NOT
- ▶ You can use parentheses to group statements too.

Shell Arithmetic with `(())`

- ▶ This mostly works just like C++ arithmetic does.
- ▶ `**` does exponentiation
- ▶ You can do ternaries! `((3 < 5 ? 3 : 5))`
- ▶ You don't need `$` on the front of normal variables.
- ▶ Shell Arithmetic Manual

Spiffy++ Example `runit3.sh`

```
#!/bin/bash

if (( $# > 0 )); then
    fg++ *.cpp -o $1
else
    fg++ *.cpp
fi

if [[ $? -eq 0 ]]; then
    ./a.out
fi
```

(Could you spiff it up even more with file checks?)

Case statements

```
#!/bin/bash
```

```
case $1 in
```

```
    a)
```

```
        echo "a, literally"
```

```
        ;;
```

```
    b*)
```

```
        echo "Something that starts with b"
```

```
        ;;
```

```
    *c)
```

```
        echo "Something that ends with c"
```

```
        ;;
```

```
    "*d")
```

```
        echo "*d, literally"
```

```
        ;;
```

```
    *)
```

```
        echo "Anything"
```

```
        ;;
```

```
esac
```

For Looping `for.sh`

```
#!/bin/bash
```

```
echo C-style:
```

```
for (( i=1; i < 9; i++ )); do
```

```
    echo $i;
```

```
done
```

```
echo BASH-style:
```

```
for file in *.sh; do
```

```
    echo $file
```

```
done
```

While Looping `while.sh`

```
#!/bin/bash
```

```
input=""
```

```
while [[ $input != "4" ]]; do
```

```
    echo "Please enter the random number: "
```

```
    read input
```

```
done
```


Reading Files `quine.sh`

```
#!/bin/bash

IFS= # Inter-field separator.
    # Unset to prevent word splitting

while read f; do
    echo "$f"
done < "$0"
```

What is a quine?

Functions `function.sh`

```
#!/bin/bash
```

```
parrot() {  
    while (( $# > 0 )); do  
        echo "$1"  
        shift  
    done  
}
```

```
parrot These are "several arguments"
```

Miscellany

- ▶ Escaping characters: use `\` on `\, `, $, ", '`

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- ▶ Escaping characters: use `\` on `\, ` , $, " , '`
- ▶ `pushd` and `popd` create a stack of directories
- ▶ `dirs` lists the stack
- ▶ Use these instead of `cd`