Shell Topic 05: The Glob

Note 1. The POSIX shell has a built-in pattern matching feature for working with files. This is one of the most powerful features of the shell, but also one of the most dangerous. The *glob* operator `*` matches zero or more of any character, the *wildcard* operator `?` matches exactly one of any character, and the *character class* operators `[ ]` match any character contained within the square brackets. There are of course some subtlties:

1. The behavior of `*` and `?` in the shell is related to the bahavior in regex, but not exactly the same. In regex, these two operators modify the previous expression, in the shell they are a command by themselves and do not modify anything. The shell glob and wildcard operators were invented first in the 1960s and the regex syntax was developed in the 70s and 80s.
2. If the first character between the square brackets is `^`, then the character class matches any character not contained with in the brackets. This behavior is the same between shell and regex.
3. The glob and wildcard operators do not match a dot at the beginning of the file, and so do not match hidden files.

Problem 2. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch hello world
$ touch hola mundo
$ touch salve munde
$ rm *e*
$ ls | wc -l
```

Fraction of LLMs with correct answer: 5 / 20 = 0.25

Problem 3. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch hello world
$ touch hola mundo
$ touch salve munde
$ rm e*
$ ls | wc -l
```

Fraction of LLMs with correct answer: 3 / 20 = 0.15

Problem 4. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch hello world
$ touch hola mundo
$ touch salve munde
$ rm *e
$ ls | wc -l
```

Fraction of LLMs with correct answer: 4 / 20 = 0.20

Problem 5. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch hello world
$ touch hola mundo
$ touch salve munde
$ rm *[eo]
$ ls | wc -l
```

Fraction of LLMs with correct answer: 9 / 17 = 0.53

Problem 6. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch hello world
$ touch hola mundo
$ touch salve munde
$ rm *[^eo]
$ ls | wc -l
```

Fraction of LLMs with correct answer: 6 / 17 = 0.35

Problem 7. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch .hello world
$ touch .hola mundo
$ touch .salve munde
$ rm *e*
$ ls -a | wc -l
```

Fraction of LLMs with correct answer: 2 / 20 = 0.10

Problem 8. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch .hello world
$ touch .hola mundo
$ touch .salve munde
$ rm .*e
$ ls -a | wc -l
```

Fraction of LLMs with correct answer: 2 / 20 = 0.10

Problem 9. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch "hello world"
$ touch "hola mundo"
$ touch "salve munde"
$ rm *d?
$ ls | wc -l
```

Fraction of LLMs with correct answer: 6 / 20 = 0.30

Problem 10. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch "hello world"
$ touch "hola mundo"
$ touch "salve munde"
$ rm *d?
$ ls | wc -l
```

Fraction of LLMs with correct answer: 5 / 20 = 0.25

Note 11. The glob does not expand within quotes. If the glob expression has no matches, then the literal expression is passed as an argument.

Problem 12. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch "hello world"
$ touch "hola mundo"
$ touch "salve munde"
$ touch *
$ ls | wc -l
```

Fraction of LLMs with correct answer: 6 / 20 = 0.30

Problem 13. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch *
$ ls | wc -l
```

Fraction of LLMs with correct answer: 4 / 20 = 0.20

Problem 14. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch *
$ ls | wc -l
```

Fraction of LLMs with correct answer: 5 / 20 = 0.25

Problem 15. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch "hello world"
$ touch "hola mundo"
$ touch "salve munde"
$ touch "*"
$ ls | wc -l
```

Fraction of LLMs with correct answer: 14 / 20 = 0.70

Problem 16. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch "hello world"
$ touch "hola mundo"
$ touch "salve munde"
$ touch "*"
$ ls | wc -l
```

Fraction of LLMs with correct answer: 16 / 20 = 0.80

Note 17. Glob expansion happens after the shell processes the spaces that separate the list of strings to loop over.

Problem 18. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch "hello world"
$ touch "hola mundo"
$ touch "salve munde"
$ for i in *; do echo $i; done | wc -l
```

Fraction of LLMs with correct answer: 16 / 20 = 0.80

Problem 19. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch hello world
$ touch hola mundo
$ touch salve munde
$ for i in *; do echo $i; done | wc -l
```

Fraction of LLMs with correct answer: 8 / 20 = 0.40

Problem 20. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ touch hello world
$ touch hola mundo
$ touch salve munde
$ for i in "*"; do echo $i; done | wc -l
```

Fraction of LLMs with correct answer: 6 / 20 = 0.30

Problem 21. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ for i in *; do echo $i; done | wc -l
```

Fraction of LLMs with correct answer: 2 / 20 = 0.10

Note 22. Glob expansion happens in the shell, before the parameters are sent to the program. This can have unintended side effects. If you are working in a directory where someone else is allowed to create files, they can create files that will be expanded by `*` into command line arguments. This problem can be mitigated by using `./*` instead of `*`.

Note 23. This note describes a non-POSIX GNU extension to the shell. It is widely supported and very useful, and is the only non-POSIX syntax in this sequence of quizes. Command line arguments that appear after a `--` will always be interpreted as files. It is therefore safe to use the glob after `--` and files will not be able to change the behavior of a program.

Problem 24. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ mkdir test
$ rm *
$ ls
```

Fraction of LLMs with correct answer: 10 / 20 = 0.50

Problem 25. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ mkdir test
$ echo evil > -rf
$ rm *
$ ls
```

Fraction of LLMs with correct answer: 6 / 20 = 0.30

Problem 26. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ mkdir test
$ echo evil > -rf
$ rm ./*
$ ls
```

Fraction of LLMs with correct answer: 6 / 20 = 0.30

Problem 27. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ mkdir test
$ rm -- -rf *
$ ls
```

Fraction of LLMs with correct answer: 13 / 20 = 0.65

Problem 28. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ mkdir test
$ rm -rf -- *
$ ls
```

Fraction of LLMs with correct answer: 20 / 20 = 1.00

Problem 29. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ mkdir -- -a
$ echo evil > -a/evil
$ ls *
```

Fraction of LLMs with correct answer: 1 / 20 = 0.05

Problem 30. Write the output of the final command in the following shell script.

```
$ cd; rm -rf quiz; mkdir quiz; cd quiz
$ mkdir -- -a
$ echo evil > -a/evil
$ ls -- *
```

Fraction of LLMs with correct answer: 7 / 20 = 0.35

LLM Model Performance