CS340 Operating Systems

HOP10 -- BASH -- String Manipulation

Preparation

1. Connect to your Ubuntu instance

   - Open a command prompt
   - Syntax: ssh -i LOCATION_OF_YOUR_KEY ubuntu@PULIC_DNS
   - Example:

   ```
   ssh -i key.pem ubuntu@ec2-33-222-101-222.us-west-2.compute.amazonaws.com
   ```

2. Navigate to your name directory under the IS340-Summer-2020

   ```
   cd ~/ IS340-Summer-2020/ThaddeusThomas
   ```

3. Create a Module9 directory under [ThaddeusThomas] directory.
   Note: If this directory exists, skip this step.

   ```
   mkdir Module9
   ```

4. Navigate to the Module9 directory.

   ```
   cd Module9
   ```

Concatenate strings

1. Concatenating strings is very easy in the Bash. Try it by typing follow commands:

   ```
   str1=Kevin
   str2=Wang
   str3="$str1 $str2 says hi"
   echo $str3
   ```

2. After Bash 3.1, we can use += operator to concatenate strings. Test it by typing the following command:

```
str3+=" there."
echo $str3
```

Process character by character and reverse a string

1. Test the following commands to see how bash script can get whole string without the first or last character:

```
testString=TestString
echo ${testString#?}
echo ${testString%?}
```

2. **Note:**

   - #? means marking one character from beginning
   - %? means marking one character from the end
   - You can use #?? to mark two characters.

3. So, we can use the follow combined commands to get the first or last character:

```
echo ${testString%${testString#?}}
echo ${testString#${testString%?}}
```

4. Try to use the technic we learned above to make a function that helps to reverse a string. Type the following command to create a script file:

```
nano Reverse.sh
```

5. Type the script into the file as below:

```bash
#! /bin/bash

reverse() {
    str=$1
    reversedStr=
    while [ -n "$str" ]
    do
        temp=${str%?}
        reversedStr=$reversedStr${str#$temp}
        str=$temp
    done
    printf "The reversed string is: %s\n" "$reversedStr"
}
```

6. Hit [CTRL+X] to quit and save the file

7. Type the following command to source the file:

```
. Reverse.sh                              3 / 5
```

8. Type the following command to test the reverse function:

```
reverse abcde
```

Case conversion

1. The tr command can help to make a character map. Test it by typing the following commands:

```
echo abc | tr abc ABC
echo abc | tr c C
echo abc | tr abc efg
```

Note: as you can see the tr command is offering a map that can map a character to any other character.

2. Try this command to map a group of characters:

```
echo "This is a full sentence." | tr 'a-z' 'A-Z'
```

1. Sometimes, we want to compare two strings that have the same characters with different cases. We can convert both strings to uppercase and compare them. Try it by typing the following commands:

```
str1=abc
str2=aBc
[[ $str1 == $str2 ]] && echo equal || echo "Not equal"
```

The result shows they are not equal since we have different cases for the letter b.
Use the following commands to overcome this:

```
[[ ${str1^^} == ${str2^^} ]] && echo equal || echo "Not equal"
```

Insert characters in a string

1. In order to perform the insertion, we have to separate the original string to the left and right part. Try this by typing the following commands:

```
str1=abcd
echo ${str1:0:2}
echo ${str1:2}
```

1. Now we can use this approach to make an insert function. Create a script file by typing the following command:

```
nano Insert.sh
```

1. Type the following script in the file:

```
#! /bin/bash
insert() {
    str=$1
    left=${str:0:$(( $3 - 1 ))}
    right=${str:$(( $3 - 1 ))}
    printf "The final string is: %s\n" "$left$2$right"
}
```

2. Hit [CTRL+X] key to quit and save the file:

3. Test the following commands to test the new function:

```
. Insert.sh
insert Hllo e 2
```

Trim unwanted characters

1. Type the following command to create a trim script:

```
nano Trim.sh
```

2. Type the following script in the file:

```
#! /bin/bash
trim() {
    str=$1
    left=${str%%[!$2]*}
```

```
        str=${str#"$left"}
        right=${str##*[!$2]}
        str=${str%"$right"}
        printf "The final string is: %s\n" "$str"
    }
```

3. Hit [CTRL+X] key to quit and save the file.

4. Test the script by typing follow commands:

```
. Trim.sh
trim 0000213.43000 0
```

Push your work to GitHub

Run the following commands to push your work to the GitHub repository:

```
git add .
git commit -m "Submission for Module 10"
git push origin ThaddeusThomas_Module_10
```

Note: you should change the YOUR_BRANCH_NAME to your own branch name. It should be firstname-lastname (e.g. maria-gracia).
If you cannot remember, run the command "git status" to check.