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OR CREATING FUNCTIONS 5

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www.oranelabs.com www.oranelabs.com www.oranelabs.com Creating a function ORANE LABS SILC The first format uses IIT KATHE Second Format! ANPUR www.therkeywordnfunction,oranehame()m{ www.oranelabs.com along with the function commands ORANE LABS name you assign to the SHC HT KANPUR SIIC block of code: SHC HT KANPUR wwfunction hame &m www.oranelabs.com www.oranelabs.com commands ORANE LABS ORANE LABS SHC HT KANPUR SHC HT KANPUR SHC HT KANPUR www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS SHC HT KANPUR SHC HT KANPUR SI#!/bin/bashANPUR # using a function in a script
WWW.oranelabs.com www.oranelabs.com function func1 { echo "This is an example of a function" ABS ORANE LABS SII Count I KANPUR SHC HT KANPUR SHC HT KANPUR wwwhile [\$count -le 5] www.oranelabs.com www.oranelabs.com do ORANE LABS Ofuncine LABS ORANE LABS count=\$[\$count + 1] SHC HT KANPUR SHC HT KANPUR wwechor This is the end of the woop an elabs.com www.oranelabs.com func1 echo "Now this is the end of the script" The ORANE LABS

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Function must have a Unique name ORANE LABS ORANE LABS

SI#!/bin/bashANPUR SIIC IIT Is Alf your redefine a function, NPUR

testing using a duplicate
www.oranelathe.com www.oranelathe.com override the original

SIIC the function mame" SIIC IIT KANPUR messages

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echo "This is a repeat of the

SIIC same function name" SIIC IIT KANPUR

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echo "This is the end of the GRANE INFOSYSTEM PVT. LTD.

script"

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OR RETURNING A VALUE BS

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The default exit status ORANE LABS ORANE LABS

SI O By default, the exit status of a function is the exit status returned by IIR. the last command in the function. After the function executes, you

www.use, the standard \$? variable to determine the exit status of the abs.com function:

#!/bin/bash_ABS

testing the exit status of a function

SHC HT KANPUR SIIfunc1() {KANPUR

echo "trying to display a non-existent file" www.oranelabs.com ls -L badfile

echo "testing the function:"

SIIfunciiT KANPUR SHC HT KANPUR echo "The exit status is: \$?"

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Using the return command ORANE LAB ORANE LABS

SI#!/bin/bashPUR

SIIC IIT KANPUR

SHC HT KANPUR

ww#v.usinglthe.creturnvcommandlin.canfunction.oranelabs.com

function dbl { read -p "Enter a value: " value

echo "doubling the value" KANPUR

www.returne\$fb\$value *2010ranelabs.com

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SHC HT KANPUR

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echo "The new

SIIC IIT KANPUR value is \$?" www.oranelabs.com

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SHC HT KANPUR

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You must be careful though when using this ANPUR www.techniqueto return a value from a function. bs.com

OR There are two things that can cause problems: BS

SIIC TRemember to retrieve the return value as soon as PIIR the function completes. www.oranelabs.com

- Remember that an exit status can only be in the

ORΔNrange of 0 to 255.ΔNE LΔBS

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Using function output ORANE LABS ORANE LABS

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 You can use this technique to retrieve any SIIC type of output from a function to assign to a NPUR

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ORAN result = 'dbl'

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Example ORANE LAD

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SI#!/bin/bashPUR

SHC HT KANPUR

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ww# using the echo to return a value

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ofunction dbla{=

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STIREAD TO LETTER A VALUE: I'T VALUE PUR

SHC HT KANPUR

wwecho \$[\$value * 2]w.oranelabs.com

www.oranelabs.com

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echo "The new value is \$result"

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Passing parameters to a function

SILC Functions can use the standard parameter KANPUR www.environment variables to represent any anelabs.com or parameters passed to the function on the SIIC COMMAND LINE SIIC IIT KANPUR SHC HT KANPUR

 For example, the name of the function is nelabs.com defined in the \$0 variable, and any parameters on the function command line are defined

using the variables \$1, \$2, and so on.

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ST#!/bin/bash ANPUR # passing parameters to a function

SHC HT

Techo -n "Let's try adding just one NPUR number: "

wwfunction addem { .com if [\$# -eq 0] || [\$# -gt 2]

www.oranevalues addem 10 www.oranelabs.com echo \$value

echo -n "Now trying adding no numbers: "

ORANE

value=`addem`

SII elif [\$# -eq 1] then IIT KANPUR

SIIC IIT lecho \$value

SHC HT KANPUR

echo \$[\$1 + \$1] www.oranelabs.com

www.oranelahumbers: "

echo -n "Finally, try adding three www.oranelabs.com value=`addem 10 15 20`

echo \$[\$1 + \$2]

ORANE echo \$value

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STechol-nT'Adding 10 and 15:S'IIC IIT KANPUR value='addem 10 15'

SHC HT KANPUR

w wecho svalue abs.com

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• Since the function uses the special parameter

OR environment variables for its own parameter \$\DS\$

SHC values, it can't directly access the script KANPUR www.parameter.values.from.the.command line.of

the script.

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SIIC #!/bin/bashur

SHC HT KANPUR

SIIC IIT KANPUR

trying to access script parameters inside a function pranelabs.com www.oranelabs.com

www.oranelabs.com function badfunc1 {

ORACHO \$[\$15 \$2 DRANE LABS

ORANE LABS

SIIC if [\$#\-eq 2R]

SIIC IIT KANPUR

SHC HT KANPUR

www.othenelabs.com www.oranelabs.com value=`badfunc1`

www.oranelabs.com

OR Aecho "The result is \$value" LABS

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echo "Usage: badtest1 a b" KANPUR

SHC HT KANPUR

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Functions use two types of variables: ANE LABS

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SHC HT KANPUR

SHC HT KANPUR

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Global variables

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WWW Global variables are variables that are valid labs.com

OR anywhere within the shell script. OR ANE LABS

SHO If you define a global variable in the main KANPUR www.section.ofa.scripty.you.dah.retrievevits.value.bs.com

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Example LABS

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SI#!/bin/bashPUR

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SHC HT KANPUR

ww# using lab global variable to pass a value w.oranelabs.com

ofunction dbla{s

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STIValue=\$[A\$value * 21] IIT KANPUR

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read -p "Enter a value: " value ORANE LABS ORANE LABS

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echo "The new value is: \$value"

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SHC HT KANPUR www.oranelabs.com

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www.oranelabs.com www.oranelabs.com www.oranelabs.com Things can go wrong #!/bin/bashpuR SIIC IIT KANPUR SHC HT KANPUR # demonstrating a bad use of variables www.ofunction_func1_{m www.oranelabs.com www.oranelabs.com temp=\$[\$value + 5] result=\$[\$temp * 2] ORANE LABS ORANE LABS temp=4 value=6 SHC HT KANPUR SHC HT KANPUR SHC www.oranelabs.com echo "The result is \$result" www.oranelabs.com if [\$temp -gt \$value] ORANE LABS ORANE LABS echo "temp is larger" else KANPUR SHC HT KANPUR SHC HT KANPUR echo "temp is smaller" www.ofranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS To do that is use the local keyword in front PUR www.of the variable declaration: com www.oranelabs.com ORANE LABS ORA-local temp ORANE LABS SHO You can also use the local keyword in ant KANPUR www.assignment.statement.while assigning a value com to the variable: ORANE LABS – local temp=\$[\$value + 5] SIIC IIT KANPUR SIIC IIT KANPUR SIIC IIT KANPUR www.oranelabs.com www.oranelabs.com www.oranelabs.com

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Example ORANE LABS

ST#!/bin/bash ANPUR SHC HT KANPUR # demonstrating the local keyword

wwfunction func1 & com www.oranelabs.com local temp=\$[\$value + 5]

result=\$[\$temp * 2]

SIIvalue=6T KANPUR

func1 echo "The result is \$result" www.oranelabs.com

if [\$temp -gt \$value] ORIANE LABS echo "temp is larger"

SHelse HT KANPUR echo "temp is smaller" www.oranelabs.com

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SHC HT KANPUR

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Designing a Function ORANE LABS ORANE LAB

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SHC HT KANPUR

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• Lets design a function to check for a valid IP ABS

SIIC addressPUR

SHC HT KANPUR

www.Function definition ranelabs.com

SHC HT KANPUR www.oranelabs.com

ORA-lisvalidip()5

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SHC HT KANPUR

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Next Step

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The first set of tests is contained in a case KANPUR

www.statementm

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ORAcase \$1/in35

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 It checks for an empty string, invalid characters, or an address that doesn't end

with a digit.

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Next we declare a local variable to set the IFS. www.oranelabs.com www.oranelabs.com www.oralocallesem

OR The set builtin replaces the positional LABS SHC parameters with its arguments. Since \$IFS is apur www.period, each element of the IP address is nelabs.com

assigned to a different parameter.

- set -- \$1 SIIC IIT KANPUR

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The final two lines check each positional KANPUR

www.parameterin turn. If it's greater than 255, it is com

or not valid in a dotted-quad/P address. If a LABS

SILC parameter is empty, it is replaced with the NANDUR

invalid value of 666. www.oranelabs.com [\${1:-666} -le 255] && [\${2:-666} -le 255] &&

ORANE \$\\$(3:-666\) -le 255 \] && [\$\\$(4:-666\) -le 255 \]RANE LABS

SHC HT KANPUR SHC HT KANPUR

SIIC IIT KANPUR

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wwisvalidip()elabs.com

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case \$1 in

STI (## Change IFS to a dot, but only in this function IPTIR local IFS=.

www.oranelabs.com www.oranelabs.com [\$#-eq4]&&

[\${1:-666} -le 255] && [\${2:-666} -le 255] && [\${3:-666} -le 255] && [\${4:-666} -le 255]

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for ip in 127.0.0.1 168.260.0.234 1.2.3.4 123.100.34.21 204.225.122.150 KANPUR

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OR printf "%15s: valid\n" "\$ip"ORANE LABS

SIICprintf "%15s: invalid\n" "\$ip"IIC IIT KANPUR

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www.oranelabs.com www.oranelabs.com www.oranelabs.com Print the Result ABS ORANE LABS SIIO A function's purpose may be to print information, either to PUR the terminal or to a file. www.oranelabs.com www.oranelabs.com www.orinfo(labs.com ORANE LABS SIIC IIUSERAN"\${USER:-No value assigned}"\IR SHC HT KANPUR "\${PWD:-No value assigned}" \ www.or@oluMns "\${coluMns:No value assigned}" \ww.oranelabs.com LINES "\${LINES:-No value assigned}" \ ORANE LABS SHELL "\${SHELL:-No value assigned}" \ HOME "\${HOME:-No value assigned}" \ SHC HT KANPUR TERM "\${TERM:-No value assigned}" www.o/>\${1:-/dev/fd/1} www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS SIPC Areally cook feature of environments variables is NPUR that they can be used as arrays. www.oranelabs.com To set multiple values for an environment OR variable, just list them in parentheses, with each 455 SIIC value separated by a space: NPUR SHC HT KANPUR - \$ mytest=(one two three four five) Not much excitement there. If you try to display the array as a normal environment variable, you'll be disappointed: SIIC #\$ echop\$mytestIIC IIT KANPUR SHC HT KANPUR www.oraneones.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS

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To reference an individual array element, you PUR www.must use a numerical index value, which nelabs.com or represents its place in the array. The numericass SHC value is enclosed in square brackets: HT KANPUR

-\$ echo \${mytest[2]}

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SHC HT KANPUR

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Displaying the entire value ORANE LABS

SHC HT KANPUR

SHC HT KANPUR

SHC HT KANPUR

To display an entire array variable, you use the OR asterisk wildcard character as the index value: B5

SIIC H'\$ iecho \\${mytest[*]}IT KANPUR

SHC HT KANPUR www.oranelabs.com

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www.oranelabs.com www.oranelabs.com www.oranelabs.com Changing values ORANE LABS SIPO You can also change the value of an individual index position: KANPIIR – \$ mytest[2]=seven www.oranelabs.com www.oranelabs.com www.oranelabs.com - one two seven four five • You can even use the unset command to remove an individual value within the array, but be careful, as this gets tricky. Watch this SHC HT KANPUR SIIC example NPUR SIIC IIT KANPUR - \$ unset mytest[2] www.oranelabs.com www.oranelabs.com • Finally, you can remove the entire array just by using the array name in the unset command: \$ unset mytest SIIC II\$ echo \${mytest[*]}IIC IIT KANPUR SHC HT KANPUR www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS www.oranelabs.com www.oranelabs.com www.oranelabs.com Passing arrays to functions ORANE LAG DRANE LABS SI#!/bin/bashIPUR SHC HT KANPUR SHC HT KANPUR www.# trying to pass an array variable com www.oranelabs.com function testit { echo "The parameters are: \$@" ORANE LABS SIIthisarrav=\$1PUR SHC HT KANPUR SHC HT KANPUR wwechoanThebreceivedwarrayrisn\${thisarray[*]}"ww.oranelabs.com myarray=(1 2 3 4 5) RANE LABS ORANE LABStestit \$myarray www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS

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SHC HT KANPUR

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SHC HT KANPUR

If you try using the array variable as a function OR parameter, the function only picks up the first B5 SHC value of the array variable PUR SHC HT KANPUR

www.To solve this problem, you must disassemble s.com the array variable into its individual values,

then use the values as function parameters.
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The Proper Technique ORANE LABS ORANE LABS

SI#!/bin/bashNPUR

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www.array.wariable.to function:testlabs.com

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function testit { local newarray

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SInewarray=("echoR"\$@")IC IIT KANPUR

SHC HT KANPUR

wwechoa"The Inew arraywvalue is: \${newarray[*]}"ww.oranelabs.com

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Si echo "The original array is \${myarray[*]}"

SHC HT KANPUR

wwtestita\${myarray[*]} www.oranelabs.com

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www.oranelabs.com #!/bin/bash www.oranelabs.com www.oranelabs.com # adding values in an array function addarray { ORANE LABS ORANE LABS local sum=0 local newarray newarray=('echo "\$@"') SHC HT KANPUR SHC HT KANPUR for value in \${newarray[*]} www.oranelabs.com www.oranelabs.com sum=\$[\$sum + \$value] done ORANE LABS ORANE LABS echo \$sum SHC HT KANPUR SHC HT KANPUR SHC HT KANPUR myarray=(1 2 3, 4 5)w wecho "The original array is: \${myarray[*]} elabs.com www.oranelabs.com arg1='echo \${myarray[*]}' result=`addarray \$arg1` ORANE LABS ORANE LABS echo "The result is \$result" SHC HT KANPUR SHC HT KANPUR SHC HT KANPUR www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS www.oranelabs.com www.oranelabs.com www.oranelabs.com Returning An Array ORANE LABS ORANE S#!/bin/bash KANPUR SIIC IIT Imyarray=(1 2 3 415) IIT KANPUR # returning an array value echo "The original array is: Plabs.com \${myarray[*]}" www.oranelabs.com www.oranela Wfunction arraydblr { com local origarray arg1=`echo \${myarray[*]}` local newarray LABS result=('arraydblr \$arg1') local elements SIIC IIT lecho l'The new array is:IT KANPUR SIIC III K www.oranelabs.com worigarray=(`echo "\$@"`) m newarray=('echo "\$@"') elements=\$[\$# - 1] = ORANE LABS ORANE LABS for $((i = 0; i \le \$elements; i++))$ SHC HIT KANPUR SHC HT KANPUR SHC HT KANPUR newarray[\$i]=\$[\${origarray[\$i]} * 2] www.oranelabs.com www.oranelabs.com echo \${newarray[*]}

}

www.oranelabs.com www.oranelabs.com www.oranelabs.com A function to perform Bubble Sort g | function bubblesort() | R SIIC IIT Idata=(rogen oscar charlie kilo indigo) NPIIR echo "Initial state:" www.oranelabs.com wwn=\${#data[@]}bs.com for i in \${data[@]} for i in 'seq 0 \$n' ORANE ORANE LABS done SHC HT KANPUR bubblesort]ranelabs.com temp=\${data[j]} www.oranelabs.com for i in \${data[@]} data[j]=\${data[j-1]} ORANE do ABS ORANE LABS OR Adata[j-1]=\$temp 5 echo "\$i" SIIC IIT Idone PUR SIICONET KANPUR SHC HT KANPUR done www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS www.oranelabs.com www.oranelabs.com www.oranelabs.com Selecting range from arrays ORANE LABS ORANE LAG You can access a range of values from the KANPUR www array by the following syntax: www.oranelabs.com ORA— echo \${array name[@]:Index2:Index2}RANE LABS SHO Example UR SHC HT KANPUR SHC HT KANPUR www.o-a\$ food=(applesybananas|cucumbersydatesreggsabs.com fajitas grapes) • \$ echo \${food[@]:0:1} ORANE LABS SIIC IIT • K\$ echo \$ (food[@]:2!4) KANPUR SIIC IIT KANPUR www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS

www.oranelabs.com www.oranelabs.com www.oranelabs.com Associative Arrays ORANE LABS SHC HT KANPUR SHC HT KANPUR SHC HT KANPUR ** The associative array is a new feature in bash ORANE LABS ORANE LABS OR version 435 SHO Associative arrays link (associate) the value ANPUR www.andethesindex together, so you can associate become metadata with the actual data. ORANE LABS SHC HT KANPUR SHC HT KANPUR SHC HT KANPUR www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS ORANE LABS www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS SHC HT KANPUR SHC HT KANPUR SIIC IIT#!/bin/bash www.orandeclare.Abeatlesw.oranelabs.com www.oranelabs.com beatles=([singer]=John [bassist]=Paul [drummer]=Ringo [guitarist]=George) SIIC IIT for musician in singer bassist drummer guitarist IT KANPUR

SIIC IIT for musician in singer bassist drummer guitarist IT KANPUR www.oranelabs.com www.oranelabs.com www.oranelabs.com echo "The \${musician} is \${beatles[\$musician]}."

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www. What makes associative arrays even more

OR Auseful is the ability to reference back to the LABS

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ORA \${!array[@]}

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Example ORANE LABS

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ORAbeatles=([singer]=John [bassist]=Paul ORANE LABS [drummer]=Ringo [guitarist]=George)

for instrument in \${!beatles[@]}
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www.oranelabs.com

do

ORANCHO "The \${instrument} is ABS

SIIC II'\${beatles[\$instrument]}KANPUR

www.o**done**abs.com

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copying an array ORANE LABS

Copying one array to another is simple. IT KANPUR

www.lt is important for quoting and spacing that abs.com

OR4he\${array[@]Pformat. LABS ORANE LABS

SIIC IIT activities=(swimming "water skiing" canoeing "white-NPUR water rafting" surfing) www.oranelabs.com

\$ for act in \${activities[@]}

ORANE do ABS ORANE LABS

IIT > echo "Activity: \$act" KANPUR > done www.oranelabs.com

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The proper way ORANE LABS

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www.ohobbies=(o"\${activities[@]}"b).com

ORA\$ for hobby in "\${hobbies[@]}"35

SHC MANPUR SHC HT KANPUR www.>aecho."Hobby: \$hobby"

> done ORANE LABS

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www.oranelabs.com www.oranelabs.com www.oranelabs.com Appending to an array ORANE SI - Appending to an array is much the same as ANPUR www.copyingitaThesimplestIway to append to anbs.com array is to extend the syntax for copying an array. SIIC IIT KANPUR \$ hobbies=("\${activities[@]" diving) www.\$for hobby in "\${hobbies[@]}" om www.oranelabs.com ORANDO LABS ORANE LABS ORANE LABS echo "Hobby: \$hobby" SHC HT KANPUR www.oranelabs.com www.oranelabs.com www.oranelabs.com ORANE LABS ORANE LABS www.oranelabs.com www.oranelabs.com www.oranelabs.com Another technique ORANE LABS ORANE LABS SIIO This notation returns the last element of the NPUR www.array.abs.com www.oranelabs.com www.oranelabs.com __[\${#hobbies[@]}] ORANE LABS Example SHC HT KANPUR \$ hobbies[\${#hobbies[@]}]=rowing www.oranelabs.com www.oranelabs.com \$ for hobby in "\${hobbies[@]}" ORANG LABS ORANE LABS ORANE LABS SIIC >Techou "Hobby: \$hobby" KANPUR SHC HT KANPUR www.oranelabs.com

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Combining two arrays DRANE LABS

The bash shell does have a builtin syntax to ANPUR www.combinetwo arraysranelabs.com www.oranelabs.com

 With the C-like notation of +=, this method is concise and allows for very clear code.

SHC HT KANPUR \$ airsports=(flying gliding parachuting)

www.oran\$ activities+=("\${airsports[@]}")com

\$ for act in "\${activities[@]}" > do

SIIC IIT X echo "Activity: \$act" T KANPUR

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SI#!/bin/bash/ANPUR # using recursion

wwfunction factorial (com if [\$1 -eq 1]

then IE LABS

SI local temp=\$[\$1-1]

local result=`factorial \$temp` www.oranelabs.com echo \$[\$result * \$1]

SHC HT KANPUR

ORANE LABS ORANE LABS

read -p "Enter value: " value

SHC HT KANPUR S | result=`factorial \$value` echo "The factorial of \$value is: \$result"

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