**Security Simulator pseudocode**

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*Simulates basic security management features of an operating system by means of a terminal interface.*

The application begins by prompting for login:

IF authentication-is-successful:

Enter command loop

ELSE

Display error message and exit

WHILE in command loop:

Display a prompt for a command

Send the command to the interpreter

IF command is valid:

Execute the command

ELSE

Display an error message

END IF

END WHILE

The command interpreter has a multitude of commands that may be interpreted:

Split interpreted command by the space character

Read the first value as the command name

Check that the number of arguments is valid for the given command

Run a custom method depending on the name of the command to execute:

BEGIN command addgroup:

IF user is not the root user:

Permission denied and exit

END IF

Check argument count for validity

Create the group with the given name if it does not exist already

END

BEGIN command adduser:

IF the user is not the root user:

Permission denied and exit

END IF

Check argument count for validity

Create the user with the given name if they do not exist already

END

BEGIN command chmod:

Check argument count for validity

Check that the resource with the given name exists

IF user is not the root user AND user does not own the resource being modified:

Permission denied and exit

END IF

Set the new permissions on the resource

END

BEGIN command chown:

IF the user is not the root user:

Permission denied and exit

END IF

Check argument count for validity

Check that the resource with the given name exists

Check that the new owner user exists

Check that the new owner group exists

If all checks passed, set the new owner user and group if specified

END

BEGIN command whoami:

Displays the name of the user who is currently logged in

END

BEGIN command lsgroups:

FOR EACH group in the database

Print the name of the group

END FOR

END

BEGIN command ls:

FOR EACH resource in the database

IF the –l option was specified:

Print the resource permissions, owner, group, and name

ELSE

Print the resource name

END FOR

END

BEGIN command lsusers:

FOR EACH user in the database

IF the –l option was specified:

Print the user name, group list, and date of last password change

END IF

END FOR

END

BEGIN command modgroup:

IF user is not the root user:

Permission denied and exit

END IF

Check argument count for validity

Check that the group with the given name exists

Check that the user with the given name exists

IF specified action = add:

Add the user to the group

ELSE IF specified action = remove:

Remove the user from the group

END IF

END

BEGIN command passwd:

IF a username was specified:

IF user is not the root user:

Permission denied and exit

ELSE

Prompt for new password

Change user’s password to new password

END IF

ELSE

Prompt for current password

IF current password = given password:

Prompt for new password

Set new password

ELSE

Display error message

END IF

END IF

END

BEGIN command rm:

Check argument count for validity

Check that the resource with the given name exists

IF the current user has write permission to the resource:

Delete the resource

ELSE

Permission denied and exit

END IF

END

BEGIN command rmgroup:

IF user is not the root user:

Permission denied and exit

END IF

Check argument count for validity

Check that the group with the given name exists

IF name of group to remove = root OR staff

Display error message explaining that the root and staff groups cannot be removed

END IF

Remove all users from the group and delete the group

END

BEGIN command rmuser:

IF user is not the root user:

Permission denied and exit

END IF

Check argument count for validity

IF name of user to remove = root

Display error message explaining that the root user cannot be removed

END IF

Remove the user

END

BEGIN command touch:

Check argument count for validity

IF no resource with the given name exists

Create the resource with the given name

Set the owner of the resource to the current user  
  
 IF the current user is a member of one or more groups

Set the group of the resource to the current user’s first/primary group

ELSE

Set the group of the resource to staff

END IF

END IF

END