Q1)
(c output)

```
[Washer/dryer housekeeper 0] has got a dryer...
[Washer/dryer housekeeper 0] has started using both the washer and dryer...
[Washer/dryer housekeeper 1]has taken articles out of the washer and dryer...
[Washer/dryer housekeeper 1] has finished with the washer...
[Washer/dryer housekeeper 1] has finished with the dryer...
[Washer/dryer housekeeper 1] is working...
[Washer housekeeper 1] wants a washer...
[Washer housekeeper 1] has got a washer...
[Washer housekeeper 1] has put laundry in the washer...
[Washer/dryer housekeeper 0]has taken articles out of the washer and dryer...
[Washer/dryer housekeeper 0] has finished with the washer...
[Washer/dryer housekeeper 0] has finished with the dryer...
[Dryer housekeeper 1] wants a dryer...
[Dryer housekeeper 1] has got a dryer...
[Dryer housekeeper 1] has put laundry in the dryer...
[Washer/dryer housekeeper 3]has taken articles out of the washer and dryer...
[Washer/dryer housekeeper 3] has finished with the washer...
[Washer/dryer housekeeper 3] has finished with the dryer...
[Washer/dryer housekeeper 3] is working...
[Washer/dryer housekeeper 2] wants a washer...
[Washer/dryer housekeeper 2] has got a washer...
[Washer/dryer housekeeper 2] wants a dryer...
[Washer/dryer housekeeper 2] has got a dryer...
[Washer/dryer housekeeper 2] has started using both the washer and dryer...
[Washer housekeeper 1] has taken articles out of the washer...
[Washer housekeeper 1] has finished with the washer...
[Washer/dryer housekeeper 1] wants a washer...
[Washer/dryer housekeeper 1] has got a washer...
[Washer/dryer housekeeper 1] wants a dryer...
[Washer/dryer housekeeper 1] has got a dryer...
[Washer/dryer housekeeper 1] has started using both the washer and dryer...
[Washer/dryer housekeeper 3] wants a washer...
[Washer/dryer housekeeper 3] has got a washer...
[Washer/dryer housekeeper 3] wants a dryer...
[Washer/dryer housekeeper 1]has taken articles out of the washer and dryer...
[Washer/dryer housekeeper 1] has finished with the washer...
[Washer/dryer housekeeper 1] has finished with the dryer...
[Washer/dryer housekeeper 3] has got a dryer...
[Washer/dryer housekeeper 3] has started using both the washer and dryer...
[Dryer housekeeper 1] has taken articles out of the dryer...
[Dryer housekeeper 1] has finished with the dryer...
[Washer/dryer housekeeper 2]has taken articles out of the washer and dryer...
[Washer/dryer housekeeper 2] has finished with the washer...
[Washer/dryer housekeeper 2] has finished with the dryer...
[Washer/dryer housekeeper 3]has taken articles out of the washer and dryer...
[Washer/dryer housekeeper 3] has finished with the washer...
[Washer/dryer housekeeper 3] has finished with the dryer...
mario8th@DESKTOP-94RT39N:/mnt/c/Users/mario/Documents/cs_college/cs499/assignments/a4$
```

(python output)

```
ousekeeper_gdv4 2 3 4 42 | python check_housekeeper.py

Checking that the output is well-formatted...
        Detected 2 washer housekeepers
        Detected 3 dryer housekeepers
        Detected 4 both washer and dryer housekeepers
Checking that every housekeeper does its required number of operations...
        Every thread does what it needs to do 10 times.
Checking that more washers or dryers haven't been used than available...
        No more washers or dryers are used than are available.
Checking that housekeepers are able to housekeep at the same time...
        Housekeepers can housekeep concurrently.
NO ERRORS DETECTED
mario8th@DESKTOP-94RT39N:/mnt/c/Users/mario/Documents/cs_college/cs499/assignments/a4$
```

This program takes in 4 parameter,s the number of washer, dryer, and washer/dryer housekeeper's, and a seed for the random wait times. After checking all input parameters are valid, it sets up a struct with 4 mutex locks, and sets up a threadHelper struct for each housekeeper. It then initiates a thread for each housekeeper. The washer housekeeper gets clothes, tries to get a washer, waits at a mutex if washers are empty, and if it can get one decrements the amount of washers available, washes the clothes, then releases the washer and continues until it has done so 10 times. The dryer housekeeper works the same as the washer, but checks for dryers instead of washers. The washer/dryer housekeeper first checks for a washer, waits if it cannot get one, decrements if it can, and then checks for a dryer, waits if it cannot get one, decrements when it can. It then washes/dries the clothes, and releases both and increments the counters when done. Each thread requests resources 10 times then exits.