Problem Statement:

Write a bash script to subdivide a given CIDR /24 and smaller subnets into a pre-defined number of smaller

After division IP addresses shouldn't be wasted, i.e. accumulation of your subdivisions should make up the divided subnet.

Every subnet has 3 IP addresses reserved and not usable by hosts: network, broadcast, gateway.

Show network/broadcast address, number of hosts and assign gateway. Gateway should be first IP available in divided subnet.

Considerations:

(1) Tough this script makes sure that the division happens with minimum wastage of hosts. So, if it is not possible to further subdivide, it keeps all the remaining hosts into the last group.
(2) Making such last group as above, it might be possible that the number of groups actually made by the script are less than the ones asked to be formed in arguments ($2).
(3) Similarly, if maximum possible hosts (say 256 in case of /24) are already formed, the script gives up further subgrouping. In this case too, it might be possible that the number of groups actually made by the script are less than the ones asked to be formed in arguments ($2).
(4) Output is a little different from the example given. Smaller grouping is printed first and then the larger grouping. However, logically, the group strength and host utilization is same.

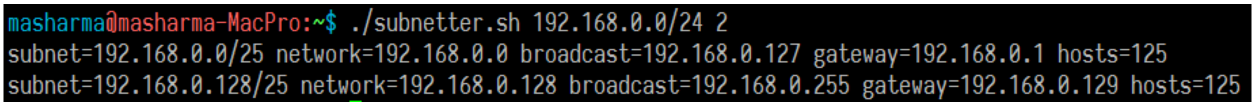
Test Cases ran:

This script is tested extensively on CIDR IP scheme upto 9 subgroups.

Almost every corner case has been handled.

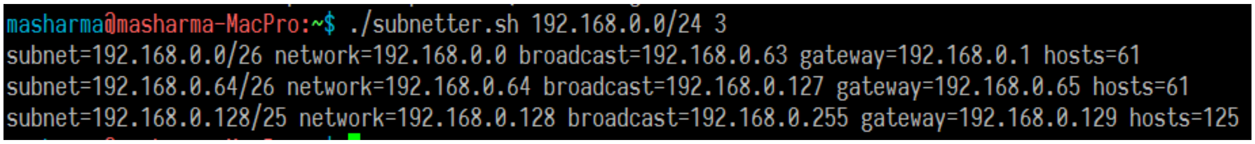
Below are the screen shots:

(1) ./subnetter.sh 192.168.0.0/24 2



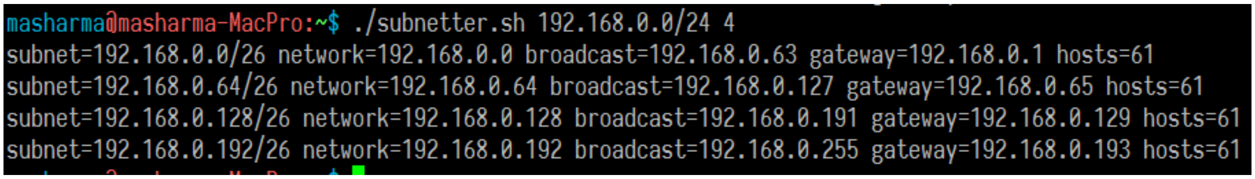
```
masharma@masharma-MacPro:~$ ./subnetter.sh 192.168.0.0/24 2
subnet=192.168.0.0/25 network=192.168.0.0 broadcast=192.168.0.127 gateway=192.168.0.1 hosts=125
subnet=192.168.0.128/25 network=192.168.0.128 broadcast=192.168.0.255 gateway=192.168.0.129 hosts=125
```

(2) ./subnetter.sh 192.168.0.0/24 3
Have a look at the output here. This is the case of Consideration No. 4 which says output sequence is different from the given example. But the logical division of subnet is same.



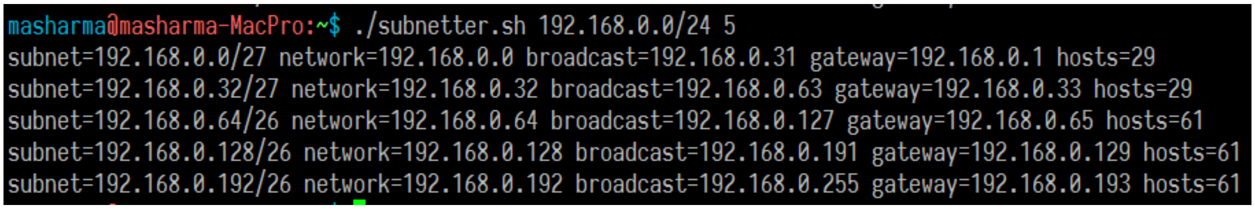
```
masharma@masharma-MacPro:~$ ./subnetter.sh 192.168.0.0/24 3
subnet=192.168.0.0/26 network=192.168.0.0 broadcast=192.168.0.63 gateway=192.168.0.1 hosts=61
subnet=192.168.0.64/26 network=192.168.0.64 broadcast=192.168.0.127 gateway=192.168.0.65 hosts=61
subnet=192.168.0.128/25 network=192.168.0.128 broadcast=192.168.0.255 gateway=192.168.0.129 hosts=125
```

(3) ./subnetter.sh 192.168.0.0/24 4



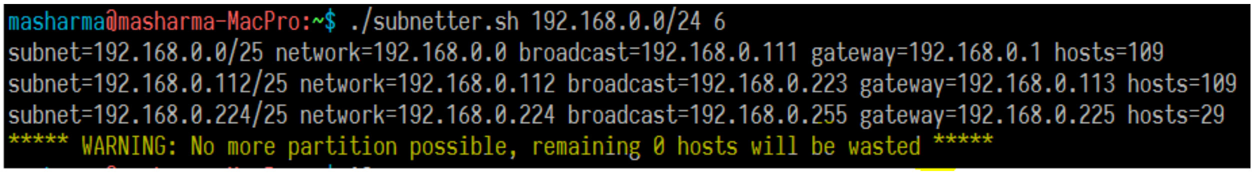
```
masharma@masharma-MacPro:~$ ./subnetter.sh 192.168.0.0/24 4
subnet=192.168.0.0/26 network=192.168.0.0 broadcast=192.168.0.63 gateway=192.168.0.1 hosts=61
subnet=192.168.0.64/26 network=192.168.0.64 broadcast=192.168.0.127 gateway=192.168.0.65 hosts=61
subnet=192.168.0.128/26 network=192.168.0.128 broadcast=192.168.0.191 gateway=192.168.0.129 hosts=61
subnet=192.168.0.192/26 network=192.168.0.192 broadcast=192.168.0.255 gateway=192.168.0.193 hosts=61
```

(4) ./subnetter.sh 192.168.0.0/24 5



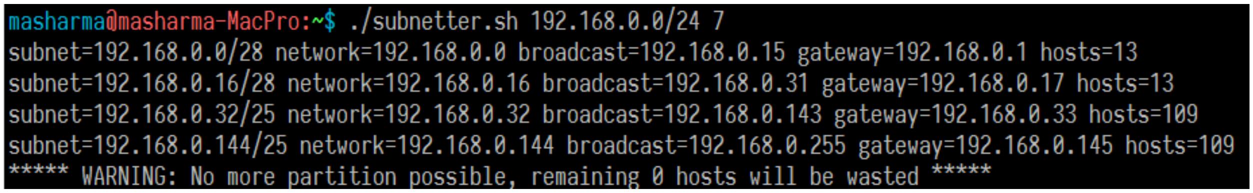
```
masharma@masharma-MacPro:~$ ./subnetter.sh 192.168.0.0/24 5
subnet=192.168.0.0/27 network=192.168.0.0 broadcast=192.168.0.31 gateway=192.168.0.1 hosts=29
subnet=192.168.0.32/27 network=192.168.0.32 broadcast=192.168.0.63 gateway=192.168.0.33 hosts=29
subnet=192.168.0.64/26 network=192.168.0.64 broadcast=192.168.0.127 gateway=192.168.0.65 hosts=61
subnet=192.168.0.128/26 network=192.168.0.128 broadcast=192.168.0.191 gateway=192.168.0.129 hosts=61
subnet=192.168.0.192/26 network=192.168.0.192 broadcast=192.168.0.255 gateway=192.168.0.193 hosts=61
```

(5) ./subnetter.sh 192.168.0.0/24 6
Have a look at the WARNING here. This is the case of Consideration No. 3.



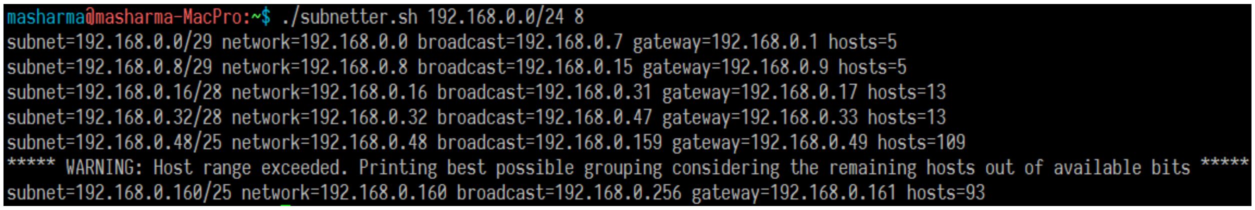
```
masharma@masharma-MacPro:~$ ./subnetter.sh 192.168.0.0/24 6
subnet=192.168.0.0/25 network=192.168.0.0 broadcast=192.168.0.111 gateway=192.168.0.1 hosts=109
subnet=192.168.0.112/25 network=192.168.0.112 broadcast=192.168.0.223 gateway=192.168.0.113 hosts=109
subnet=192.168.0.224/25 network=192.168.0.224 broadcast=192.168.0.255 gateway=192.168.0.225 hosts=29
***** WARNING: No more partition possible, remaining 0 hosts will be wasted *****
```

(6) ./subnetter.sh 192.168.0.0/24 7



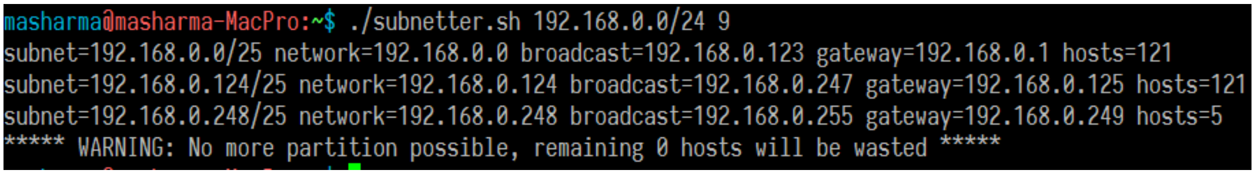
```
masharma@masharma-MacPro:~$ ./subnetter.sh 192.168.0.0/24 7
subnet=192.168.0.0/28 network=192.168.0.0 broadcast=192.168.0.15 gateway=192.168.0.1 hosts=13
subnet=192.168.0.16/28 network=192.168.0.16 broadcast=192.168.0.31 gateway=192.168.0.17 hosts=13
subnet=192.168.0.32/25 network=192.168.0.32 broadcast=192.168.0.143 gateway=192.168.0.33 hosts=109
subnet=192.168.0.144/25 network=192.168.0.144 broadcast=192.168.0.255 gateway=192.168.0.145 hosts=109
***** WARNING: No more partition possible, remaining 0 hosts will be wasted *****
```

(7) ./subnetter.sh 192.168.0.0/24 8
Have a look at the WARNING here. This is the case of Consideration No. 1-2.



```
masharma@masharma-MacPro:~$ ./subnetter.sh 192.168.0.0/24 8
subnet=192.168.0.0/29 network=192.168.0.0 broadcast=192.168.0.7 gateway=192.168.0.1 hosts=5
subnet=192.168.0.8/29 network=192.168.0.8 broadcast=192.168.0.15 gateway=192.168.0.9 hosts=5
subnet=192.168.0.16/28 network=192.168.0.16 broadcast=192.168.0.31 gateway=192.168.0.17 hosts=13
subnet=192.168.0.32/28 network=192.168.0.32 broadcast=192.168.0.47 gateway=192.168.0.33 hosts=13
subnet=192.168.0.48/25 network=192.168.0.48 broadcast=192.168.0.159 gateway=192.168.0.49 hosts=109
***** WARNING: Host range exceeded. Printing best possible grouping considering the remaining hosts out of available bits *****
subnet=192.168.0.160/25 network=192.168.0.160 broadcast=192.168.0.256 gateway=192.168.0.161 hosts=93
```

(8) ./subnetter.sh 192.168.0.0/24 9



```
masharma@masharma-MacPro:~$ ./subnetter.sh 192.168.0.0/24 9
subnet=192.168.0.0/25 network=192.168.0.0 broadcast=192.168.0.123 gateway=192.168.0.1 hosts=121
subnet=192.168.0.124/25 network=192.168.0.124 broadcast=192.168.0.247 gateway=192.168.0.125 hosts=121
subnet=192.168.0.248/25 network=192.168.0.248 broadcast=192.168.0.255 gateway=192.168.0.249 hosts=5
***** WARNING: No more partition possible, remaining 0 hosts will be wasted *****
```