Question 1

Create a directory named “main” under the home directory and create directory “file_1” and “file_2” inside. (10%)

```
whitebear13579@poweredger410:/home$ sudo mkdir main
[sudo] password for whitebear13579:
whitebear13579@poweredger410:/home$ ls
main  whitebear13579  www
whitebear13579@poweredger410:/home$ cd main
whitebear13579@poweredger410:/home/main$ mkdir file_1 && mkdir file_2
mkdir: cannot create directory ‘file_1’: Permission denied
whitebear13579@poweredger410:/home/main$ sudo mkdir file_1 && sudo mkdir file_2
whitebear13579@poweredger410:/home/main$ ls
file_1  file_2
whitebear13579@poweredger410:/home/main$
```

Question 2

Use cd command to move from file_1 to file_2 with “absolute path”, and move from file_2 to file_1 with “relative path”. (10%)(If you forget what ‘absolute path’ and ‘relative path’ mean, please refer to the slides from Week 10 HTML-2 in the course.)

```
whitebear13579@poweredger410:/home/main/file_1$ cd /home/main/file_2
whitebear13579@poweredger410:/home/main/file_2$ cd ../file_1/
whitebear13579@poweredger410:/home/main/file_1$
```

Question 3

Use script command to save disk free and disk usage output as “free.txt” in file_1. (20%)

```
whitebear13579@poweredger410:/home/main/file_1$ sudo script free.txt
Script started, output log file is 'free.txt'.
root@poweredger410:/home/main/file_1# df
Filesystem     1K-blocks     Used Available Use% Mounted on
tmpfs            3288992     2184   3286808   1% /run
/dev/sda2      478512880 80537928 373594384  18% /
tmpfs           16444956       28  16444928   1% /dev/shm
tmpfs               5120        0      5120   0% /run/lock
/dev/sda1        1098628     6244   1092384   1% /boot/efi
overlay        478512880 80537928 373594384  18% /var/lib/docker/overlay2/457b9fc73152cd45990ed47b6f6cc036b6460eb71491eb727b6604498c86c05a/merged
overlay        478512880 80537928 373594384  18% /var/lib/docker/overlay2/27229905d6b791001e9e721f9c3e26722f3d82d2e222d456f7bc79e0a401e68e/merged
overlay        478512880 80537928 373594384  18% /var/lib/docker/overlay2/822e07b42377af2aa825d1f05ae1d6e4345602275b99d7ccd899011722b0e9b0/merged
overlay        478512880 80537928 373594384  18% /var/lib/docker/overlay2/44f19b3eb1303ce91510071afc8498943d7e322aa208f49f8f6a3c9c52a98f9d/merged
overlay        478512880 80537928 373594384  18% /var/lib/docker/overlay2/466b596380b803596fc5afbc2e5ead3572e9398c38b99693744043a6ca93394a/merged
tmpfs            3288988        4   3288984   1% /run/user/1000
root@poweredger410:/home/main/file_1# du
4       .
root@poweredger410:/home/main/file_1# exit
exit
Script done.
whitebear13579@poweredger410:/home/main/file_1$
```

Question 4

Write a C program named “program_1.c” to find the prime numbers between 1 and 1000 and compile it using gcc. (25%)

Program:

```
  GNU nano 6.2                                  program_1.c *
#include <stdio.h>
#include <stdbool.h>

bool isPrime(int n) {
    if (n < 2) {
        return false;
    }
    for (int i = 2; i * i <= n; i++) {
        if (n % i == 0) {
            return false;
        }
    }
    return true;
}

int main() {
    printf("Prime Numbers Between 1 and 1000:\n");

    for (int i = 1; i <= 1000; i++) {
        if (isPrime(i)) {
            printf("%d ", i);
        }
    }

    printf("\n");
    return 0;
}

^G Help        ^O Write Out   ^W Where Is    ^K Cut         ^T Execute     ^C Location    M-U Undo       M-A Set Mark   M-] To Bracket
^X Exit        ^R Read File   ^\ Replace     ^U Paste       ^J Justify     ^/ Go To Line  M-E Redo       M-6 Copy       ^Q Where Was
```

Command:

```
whitebear13579@poweredger410:/home/main$ sudo apt install gcc
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
gcc is already the newest version (4:11.2.0-1ubuntu1).
0 upgraded, 0 newly installed, 0 to remove and 9 not upgraded.
whitebear13579@poweredger410:/home/main$ sudo nano program_1.c
whitebear13579@poweredger410:/home/main$ ls
file_1  file_2  program_1.c
whitebear13579@poweredger410:/home/main$ sudo gcc -o program_1 program_1.c
whitebear13579@poweredger410:/home/main$ ./program_1
Prime Numbers Between 1 and 1000:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97 101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 197
 199 211 223 227 229 233 239 241 251 257 263 269 271 277 281 283 293 307 311 313 317 331 337 347 349 353 359 367 373 379 383 389 397 401 409 419 421 4
31 433 439 443 449 457 461 463 467 479 487 491 499 503 509 521 523 541 547 557 563 569 571 577 587 593 599 601 607 613 617 619 631 641 643 647 653 659
 661 673 677 683 691 701 709 719 727 733 739 743 751 757 761 769 773 787 797 809 811 821 823 827 829 839 853 857 859 863 877 881 883 887 907 911 919 9
29 937 941 947 953 967 971 977 983 991 997
whitebear13579@poweredger410:/home/main$
```

Question 5

Execute the program and redirect output to the file “primes.txt”.

primes.txt 內容：

```
 GNU nano 6.2                                        primes.txt
Prime Numbers Between 1 and 1000:
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97 101 103 107 109 113 127 131 137 139 149 151 157 163 167 173 179 181 191 193 19

                                [ Directory '.' is not writable ]
^G Help        ^O Write Out   ^W Where Is    ^K Cut         ^T Execute     ^C Location    M-U Undo       M-A Set Mark   M-] To Bracket
^X Exit        ^R Read File   ^\ Replace     ^U Paste       ^J Justify     ^/ Go To Line  M-E Redo       M-6 Copy       ^Q Where Was
```

Command:

```
whitebear13579@poweredger410:/home/main$ sudo nano primes.txt
whitebear13579@poweredger410:/home/main$ ls
file_1  file_2  primes.txt  program_1  program_1.c
whitebear13579@poweredger410:/home/main$ sudo chmod 777 primes.txt
whitebear13579@poweredger410:/home/main$ ./program_1 > primes.txt
whitebear13579@poweredger410:/home/main$ nano primes.txt
whitebear13579@poweredger410:/home/main$
```

Question 6

After you have complete all the above questions, move to the home directory and use tree command to display the current directory structure of the system. (10%)

```
whitebear13579@poweredger410:/home/main$ sudo apt install tree
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
tree is already the newest version (2.0.2-1).
0 upgraded, 0 newly installed, 0 to remove and 9 not upgraded.
whitebear13579@poweredger410:/home/main$ cd ../
whitebear13579@poweredger410:/home$ tree
.
├── main
│   ├── file_1
│   │   └── free.txt
│   ├── file_2
│   ├── primes.txt
│   ├── program_1
│   └── program_1.c
├── whitebear13579
│   ├── install.sh
│   ├── munin-update.log
│   ├── snap
│   │   └── pycdc
│   │       ├── 357
│   │       ├── common
│   │       └── current -> 357
│   └── strings
└── www

10 directories, 7 files
whitebear13579@poweredger410:/home$
```