Assignment 1

Q1 Write down the specifications (ex. cores, memory, Architecture etc...) of your system with the screenshot of the specification and its explanation (what each term is representing). Explanation should be handwritten?

```
cndc-14@cndc14-OptiPlex-3050-AIO: $ lscpu
Architecture:            x86_64
  CPU op-mode(s):        32-bit, 64-bit
  Address sizes:         39 bits physical, 48 bits virtual
  Byte Order:            Little Endian
CPU(s):                  8
  On-line CPU(s) list:   0-7
Vendor ID:               GenuineIntel
  Model name:            Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz
    CPU family:          6
    Model:               158
    Thread(s) per core:  2
    Core(s) per socket:  4
    Socket(s):           1
    Stepping:            9
    CPU max MHz:         800.0000
    CPU min MHz:         800.0000
    BogoMIPS:            1599.97
    Flags:               fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mc
                         a cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss
                         ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc art
                          arch_perfmon pebs bts rep_good nopl xtopology nonstop_
                         tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cp
                         l vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid ss
                         e4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
                         xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_f
                         ault epb invpcid_single pti ssbd ibrs ibpb stibp tpr_sh
                         adow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adj
                         ust bmi1 avx2 smep bmi2 erms invpcid mpx rdseed adx sma
                         p clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dt
                         herm arat pln pts hwp hwp_notify hwp_act_window hwp_epp
                          md_clear flush_l1d arch_capabilities
Virtualization features:
  Virtualization:        VT-x
Caches (sum of all):
  L1d:                   128 KiB (4 instances)
  L1i:                   128 KiB (4 instances)
  L2:                    1 MiB (4 instances)
  L3:                    8 MiB (1 instance)
```

Ans 1: **Architecture**

The Architecture field shows what type of CPU you have.
In the example above, X86_64 represents 64bit extension of X86 instruction set. Consists of rules and methods or procedures which describe the implementation, functionality of the computer systems.

CPU op-mode — displays operation mode.

The CPU op-mode(s) option in the command output tells whether the given Linux is 32 or 64 bits. If it shows 32-bit or 64-bit then Linux is 64 bits as it supports both 32- and 64-bit memory.

Address sizes

The physical address of a CPU is 39-bit, the virtual address size gives you the size of the virtual address space that is how much memory a single program can address (48-bit).

Byte order

Displays endianness (order in which bytes are arranged in memory).

CPU (s)

Displays number of logical CPUs as seen by operating system.
The list of on-line CPU (s) list is of: 0-7

Caches

CPU MHz — Clock speed of processor.

Processor performance is sometimes measured in IPC (Instructions per cycle) / CPI (Cycles per instructions). IPCs/CPIs can further be increased through various methods e.g., pipelining. However, higher CPU speed doesn't necessarily mean better performance. What matters is what is being done during CPU cycles. Often Times, CPU is less of bottleneck than memory access or disk access.

L1d cache: Size of L1d cache. (Data cache)

L1i cache: Size of L1i cache. (Instruction cache)

L2 cache: Size of L2 cache.

L3 cache: Size of L3 cache.

Q2. What is the speed of the processor of your system?

Ans: 3.60GHz

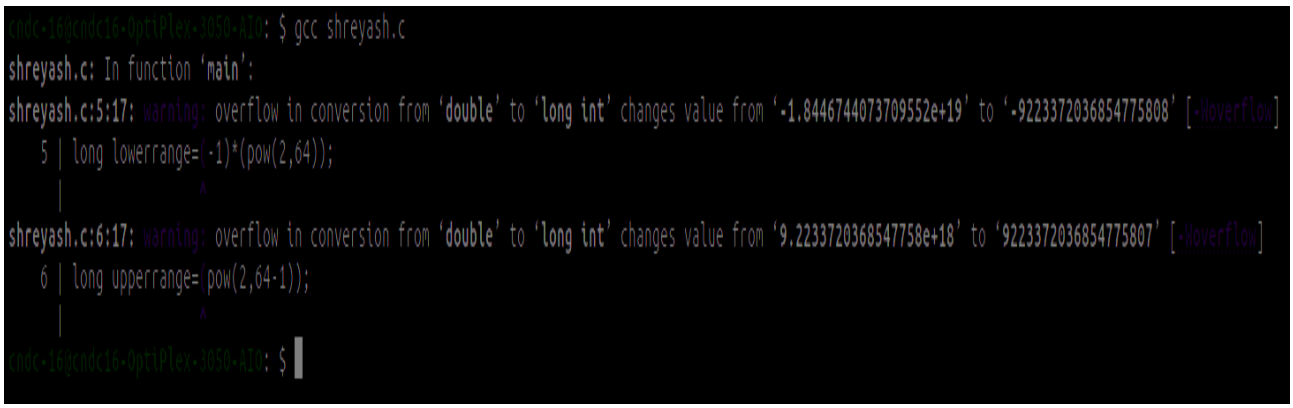
A computer's processor clock speed determines how quickly the central processing unit (CPU) can retrieve and interpret instructions.

Q3. what is the byte order of your system and what does it represent?

Ans: The byte order is little endian. It represents the order in which bytes are arranged in memory.

Q4. What is the range of numbers you can store in your system. (Minimum number after which underflow takes place and maximum number after which overflow take place) with the screenshot and explanation of the experiment?

Ans: Minimum value :-(2^63) =-(9*10^19)
Maximum value: 2^63-1= 9*10^19



```c
#include<stdio.h>
#include<math.h>
int main()
{
long lowerrange=(-1)*(pow(2,64));
long upperrange=(pow(2,64-1));
printf("%li %li",lowerrange, upperrange);
return 0;
}
```

Q5 Write a simple Hello world program?

Ans:

```c
#include <stdio.h>

    int main () {
        printf("Hello  world");

        return 0;
}
```

```c
#include<stdio.h>
int main() {
    printf("Hello world");
    return 0;
}
```