1. True or False?

Circle or cross: "T" if True – "F" if False.

```
$ ls -al
  dr-x--x--x 2 demo demo 4096 Oct 17 17:06 tmp
```

T / F All users can enter directory “tmp/”.

T / F 2 + 2 = 3

2. Answer these following questions

(a) What is your name?
(b) When is your birthday?

3. Fill the remaining empty “output” cells

<table>
<thead>
<tr>
<th>Script</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>echo &quot;1 2 3 4 5&quot;</td>
<td>awk '{print $1 &quot; &quot; $5}’</td>
</tr>
<tr>
<td>echo \abc&quot;</td>
<td>tr '[a-z]' '[A-Z]'</td>
</tr>
</tbody>
</table>

4. 2016-2

Page Table (Waterloo 2012). Consider this following ”structure addrspace” of a 32-bit processor.

```c
struct addrspace {
   vaddr_t as_vbase1 = 0x00100000; /* text segment: virtual base addr */
   paddr_t as_pbase1 = 0x10000000; /* text segment: physical base addr */
   size_t as_npages1 = 0x20; /* text segment: number of pages */
   vaddr_t as_vbase2 = 0x00200000; /* data segment: virtual base addr */
   paddr_t as_pbase2 = 0x20000000; /* data segment: physical base addr */
   size_t as_npages2 = 0x20; /* data segment: number of pages */
   vaddr_t as_vbase3 = 0x80000000; /* stack segment: virtual base addr */
   paddr_t as_pbase3 = 0x80000000; /* stack segment: physical base addr */
};
```

When possible, translate the provided address.

<table>
<thead>
<tr>
<th>Possible</th>
<th>Virtual Address</th>
<th>Physical Address</th>
<th>Segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>0x0010 0000</td>
<td>0x1000 0000</td>
<td>text</td>
</tr>
<tr>
<td>0x0010 FEIDC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0011 0000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. 2016-2

(a) Fill this following with ”ASP” (Application Software Provider) or ”SaaS” (Software as a Service)
a separate instance of the application is maintained for each business
always Up-to-Date for the whole service
closer to Legacy Software
lacks scalability for the vendor
supports multi-tenancy (multiple customers)

(b) There exists four (4) identical processes, with this following CPU utilization table:

<table>
<thead>
<tr>
<th>Multiprogramming Combination (%)</th>
<th>A</th>
<th>A + A</th>
<th>A + A + A</th>
<th>A + A + A + A</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU utilization per process A</td>
<td>10</td>
<td>9.5</td>
<td>9</td>
<td>8.6</td>
</tr>
</tbody>
</table>

The CPU time of each process is 43 seconds. Print the output when the system runs:
How long will be the total time to run concurrently all (4) processes together?!