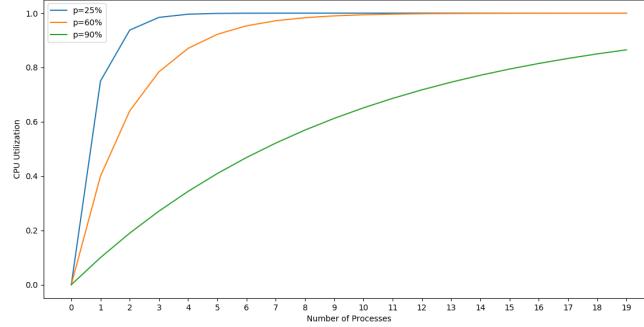- **Ex. 1**

  1. The probability is $1 - p^n$, and the CPU utilization is also $1 - p^n$

  2. The graph is shown below:

  3. (a) There can be $\lfloor \frac{256-96}{48} \rfloor = 3$ processes.

  (b) CPU utilization is $1 - (0.9)^3 = 27.1\%$

  (c) The result are shown below

Adding	Number of Processes	CPU Utilization
256MB	8	56.95%
512MB	14	77.12%
1024MB	24	92.02%

  It can be seen that adding 256MB will get the highest profit of CPU utilization improvement per MB, so it is the best.

- **EX. 2**

  To accomplish this modification, those changes must be applied:

  1. Go to /usr/src/minix/servers/is/dmp.c, add a line like the following.

```
{ SF5,   mapping_dmp, "Print key mappings" },
{ SF6,   rproc_dmp, "Reincarnation server process table" }
{ SF7,   pronum_dmp, "Display the number of running processes"
    }, //added
{ SF8,   data_store_dmp, "Data store contents" },
{ SF9,   procstack_dmp, "Processes with stack traces" },
```

2. Go to proto.h in the same directory, and add the following line:

```
1  void pronum_dmp(void);
```

3. Go to dmp_kernel.c and add the following function:

```
1  void pronum_dmp(void){
2          struct proc *pro;
3          int r;
4          if ((r=sys_getproctab(proc))!=OK){
5                  printf("IS: warning: couldn't get copy of
                          process table: %d\n",r
6  );
7                  return;
8          }
9          int result=0;
10         for (pro=BEG_PROC_ADDR;pro<END_PROC_ADDR;pro++) {
11                 if (!isempty(pro)) result++;
12         }
13         printf("There are totally %d processes\n",result);
14 }
```