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TE-IT 35026

ASSIGNMENT 2(A)

//Zombie State

```
#include <stdio.h>
#include <sys/types.h>
#include <sys/wait.h>
#include <stdlib.h>
#include <unistd.h>

//bubble sort
void bubbleSort(int array[], int size)
{
    for (int step = 0; step < size - 1; ++step)
    {
        for (int i = 0; i < size - step - 1; ++i)
        {
            if (array[i] > array[i + 1])
            {
                int temp = array[i];
                array[i] = array[i + 1];
                array[i + 1] = temp;
            }
        }
    }
}

void printArray_bubble(int array[], int size)
{
    for (int i = 0; i < size; ++i)
    {
        printf("%d ", array[i]);
    }
}

//quick sort
void swap(int *a, int *b) {
    int t = *a;
    *a = *b;
    *b = t;
}

int partition(int array[], int low, int high) {
    int pivot = array[high];
```

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```
int i = (low - 1);

for (int j = low; j < high; j++) {
    if (array[j] <= pivot) {

        i++;
        swap(&array[i], &array[j]);
    }
}
swap(&array[i + 1], &array[high]);
return (i + 1);
}

void quickSort(int array[], int low, int high) {
    if (low < high) {
        int pi = partition(array, low, high);
        quickSort(array, low, pi - 1);
        quickSort(array, pi + 1, high);
    }
}

void printArray_quick(int array[], int size) {
    for (int i = 0; i < size; ++i) {
        printf("%d ", array[i]);
    }
    printf("\n");
}

void main()
{
    int data[] = {8,5,7,6,3};
    int size = sizeof(data) / sizeof(data[0]);
    int pid, status;

    pid = fork();

    if(pid==0)
    {

        printf("\n Welcome to child process");
        printf("\n Child process id %d \n",getpid());
        printf("\n Child's parent process id %d \n",getppid());

        printf("\n Unsorted Array : ");
        printArray_quick(data, size);
        bubbleSort(data, size);

        printf(" Bubble Sort :: Sorted Array in Ascending Order : ");
    }
}
```

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```
        printArray_bubble(data, size);
        printf("\n\n");
    }
    else if(pid!=0)
    {
        printf("\n");
        sleep(5);
        system("ps -aux");
        printf("\n Welcome to Parent process");
        printf("\n parent process id %d \n",getpid());

        printf("\n Unsorted Array : ");
        printArray_quick(data, size);
        quickSort(data, 0, size - 1);

        printf(" Quick sort :: Sorted array in ascending order : ");
        printArray_quick(data, size);
    }
}
```

```
ubuntu@ubuntu:~/Desktop$ gcc zombie.c
ubuntu@ubuntu:~/Desktop$ ./a.out
```

```
Welcome to child process
Child process id 6555
```

```
Child's parent process id 6554
```

```
Unsorted Array : 8 5 7 6 3
```

```
Bubble Sort :: Sorted Array in Ascending Order : 3 5 6 7 8
```

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root	1	0.5	0.3	104360	13868	?	Ss	11:33	0:07	/sbin/init --
root	2	0.0	0.0	0	0	?	S	11:33	0:00	[kthreadd]
root	3	0.0	0.0	0	0	?	I<	11:33	0:00	[rcu_gp]
root	4	0.0	0.0	0	0	?	I<	11:33	0:00	[rcu_par_gp]
root	5	0.0	0.0	0	0	?	I<	11:33	0:00	[slub_flushwq]
root	6	0.0	0.0	0	0	?	I<	11:33	0:00	[netns]
root	8	0.0	0.0	0	0	?	I<	11:33	0:00	[kworker/0:0H]
root	10	0.0	0.0	0	0	?	I<	11:33	0:00	[mm_percpu_wq]
root	11	0.0	0.0	0	0	?	I	11:33	0:00	[rcu_tasks_kt]
root	12	0.0	0.0	0	0	?	I	11:33	0:00	[rcu_tasks_ru]
root	13	0.0	0.0	0	0	?	I	11:33	0:00	[rcu_tasks_tr]
root	14	0.6	0.0	0	0	?	S	11:33	0:09	[ksoftirqd/0]
root	15	0.6	0.0	0	0	?	I	11:33	0:09	[rcu_preempt]
root	16	0.0	0.0	0	0	?	S	11:33	0:00	[migration/0]

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root	16	0.0	0.0	0	0 ?	S	11:33	0:00	[migration/0]
root	17	0.0	0.0	0	0 ?	S	11:33	0:00	[idle_inject/
root	19	0.0	0.0	0	0 ?	S	11:33	0:00	[cpuhp/0]
root	20	0.0	0.0	0	0 ?	S	11:33	0:00	[cpuhp/1]
root	21	0.0	0.0	0	0 ?	S	11:33	0:00	[idle_inject/
root	22	0.0	0.0	0	0 ?	S	11:33	0:01	[migration/1]
root	23	0.4	0.0	0	0 ?	S	11:33	0:06	[ksoftirqd/1]
root	25	0.0	0.0	0	0 ?	I<	11:33	0:00	[kworker/1:0H
root	26	0.0	0.0	0	0 ?	S	11:33	0:00	[kdevtmpfs]
root	27	0.0	0.0	0	0 ?	I<	11:33	0:00	[inet_frag_wq
root	28	0.0	0.0	0	0 ?	S	11:33	0:00	[kauditd]
root	29	0.0	0.0	0	0 ?	S	11:33	0:00	[khungtaskd]
root	31	0.0	0.0	0	0 ?	S	11:33	0:00	[oom_reaper]
root	32	1.5	0.0	0	0 ?	I	11:33	0:21	[kworker/u4:2
root	33	0.0	0.0	0	0 ?	I<	11:33	0:00	[writeback]
root	34	0.0	0.0	0	0 ?	S	11:33	0:00	[kcompactd0]
root	35	0.0	0.0	0	0 ?	SN	11:33	0:00	[ksmd]
root	36	0.8	0.0	0	0 ?	I	11:33	0:11	[kworker/1:1-
root	37	0.0	0.0	0	0 ?	SN	11:33	0:00	[khugepaged]
root	38	0.0	0.0	0	0 ?	I<	11:33	0:00	[kintegrityd]
root	39	0.0	0.0	0	0 ?	I<	11:33	0:00	[kblockd]
root	40	0.0	0.0	0	0 ?	I<	11:33	0:00	[blkcg_punt_b
root	41	0.0	0.0	0	0 ?	I<	11:33	0:00	[tpm_dev_wq]
root	42	0.0	0.0	0	0 ?	I<	11:33	0:00	[ata_sff]
root	43	0.0	0.0	0	0 ?	I<	11:33	0:00	[md]
root	44	0.0	0.0	0	0 ?	I<	11:33	0:00	[edac-poller]
root	45	0.0	0.0	0	0 ?	I<	11:33	0:00	[devfreq_wq]
root	46	0.0	0.0	0	0 ?	S	11:33	0:00	[watchdogd]
root	47	1.6	0.0	0	0 ?	I<	11:33	0:22	[kworker/1:1H
root	48	0.4	0.0	0	0 ?	S	11:33	0:05	[kswapd0]
root	49	0.0	0.0	0	0 ?	S	11:33	0:00	[ecryptfs-kth
root	50	0.0	0.0	0	0 ?	I<	11:33	0:00	[kthrotld]
root	51	0.0	0.0	0	0 ?	I<	11:33	0:00	[acpi_thermal
root	52	0.0	0.0	0	0 ?	S	11:33	0:00	[xenbus_probe

root	53	0.0	0.0	0	0 ?	S	11:33	0:00	[scsi_eh_0]
root	54	0.0	0.0	0	0 ?	I<	11:33	0:00	[scsi_tmf_0]
root	55	0.0	0.0	0	0 ?	S	11:33	0:00	[scsi_eh_1]
root	56	0.0	0.0	0	0 ?	I<	11:33	0:00	[scsi_tmf_1]
root	57	0.4	0.0	0	0 ?	I	11:33	0:06	[kworker/u4:3
root	59	0.9	0.0	0	0 ?	I	11:33	0:12	[kworker/u4:5
root	60	0.0	0.0	0	0 ?	I<	11:33	0:00	[mld]
root	62	0.1	0.0	0	0 ?	I<	11:33	0:01	[kworker/0:1H
root	63	0.0	0.0	0	0 ?	I<	11:33	0:00	[ipv6_addrcon
root	70	0.0	0.0	0	0 ?	I<	11:33	0:00	[kstrp]
root	72	0.0	0.0	0	0 ?	I<	11:33	0:00	[zswap-shrink
root	73	0.0	0.0	0	0 ?	I<	11:33	0:00	[kworker/u5:0
root	77	0.0	0.0	0	0 ?	I<	11:33	0:00	[charger_mana
root	132	0.0	0.0	0	0 ?	I<	11:33	0:00	[cryptd]
root	138	0.0	0.0	0	0 ?	S	11:33	0:00	[scsi_eh_2]
root	139	0.0	0.0	0	0 ?	I<	11:33	0:00	[scsi_tmf_2]
root	148	0.0	0.0	0	0 ?	S	11:33	0:00	[irq/18-vmwgf
root	832	0.1	0.3	49792	11660 ?	S<s	11:33	0:01	/lib/systemd/
root	850	0.2	0.0	0	0 ?	I	11:33	0:03	[kworker/0:3-
root	868	0.1	0.2	28488	7576 ?	Ss	11:33	0:01	/lib/systemd/
root	1010	0.0	0.0	0	0 ?	S<	11:33	0:00	[spl_system_t
root	1011	0.0	0.0	0	0 ?	S<	11:33	0:00	[spl_delay_ta
root	1012	0.0	0.0	0	0 ?	S<	11:33	0:00	[spl_dynamic_
root	1013	0.0	0.0	0	0 ?	S<	11:33	0:00	[spl_kmem_cac
root	1014	0.0	0.0	0	0 ?	S<	11:33	0:00	[zvol]
root	1015	0.0	0.0	0	0 ?	S	11:33	0:00	[arc_prune]
root	1016	0.0	0.0	0	0 ?	S	11:33	0:00	[arc_evict]
root	1017	0.0	0.0	0	0 ?	SN	11:33	0:00	[arc_reap]
root	1018	0.0	0.0	0	0 ?	S	11:33	0:00	[dbu_evict]
root	1019	0.0	0.0	0	0 ?	SN	11:33	0:00	[dbuf_evict]
root	1020	0.0	0.0	0	0 ?	SN	11:33	0:00	[z_vdev_file]
root	1021	0.0	0.0	0	0 ?	S	11:33	0:00	[l2arc_feed]

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systemd+	1086	0.2	0.2	16204	7168 ?	Ss	11:33	0:02	/lib/systemd/
systemd+	1087	0.1	0.2	20368	10240 ?	Ss	11:33	0:01	/lib/systemd/
systemd+	1088	0.0	0.2	89692	7424 ?	Ssl	11:33	0:00	/lib/systemd/
avahi	1305	0.0	0.1	8472	4096 ?	Ss	11:33	0:00	avahi-daemon:
message+	1306	0.1	0.1	11896	6528 ?	Ss	11:33	0:02	@dbus-daemon:
root	1310	0.0	0.1	82756	3840 ?	Ssl	11:33	0:00	/usr/sbin/irq
root	1324	0.0	0.2	310048	9796 ?	Ssl	11:33	0:00	/usr/libexec/
root	1326	0.0	0.2	322260	7296 ?	Ssl	11:33	0:00	/usr/libexec/
root	1329	0.8	0.5	1401032	19536 ?	Ssl	11:33	0:11	/usr/lib/snap
root	1335	0.0	0.2	322164	7256 ?	Ssl	11:33	0:00	/usr/libexec/
root	1340	0.0	0.0	18412	2432 ?	Ss	11:33	0:00	/usr/sbin/cro
root	1342	0.0	0.1	318688	6656 ?	Ssl	11:33	0:00	/usr/libexec/
root	1343	0.0	0.2	24940	8192 ?	Ss	11:33	0:00	/lib/systemd/
root	1344	0.0	0.3	466188	11452 ?	Ssl	11:33	0:01	/usr/libexec/
root	1346	0.0	0.1	166720	4608 ?	Ssl	11:33	0:00	/usr/sbin/zed
avahi	1349	0.0	0.0	8284	1296 ?	S	11:33	0:00	avahi-daemon:
root	1350	0.1	0.3	343300	14144 ?	Ssl	11:33	0:01	/usr/sbin/Net
root	1351	0.0	0.1	16460	5632 ?	Ss	11:33	0:00	/sbin/wpa_sup
root	1373	0.0	0.2	317176	9428 ?	Ssl	11:33	0:00	/usr/sbin/Mod
syslog	1381	0.0	0.1	222352	5888 ?	Ssl	11:33	0:00	/usr/sbin/rsy
root	1407	0.0	0.2	46204	10368 ?	Ss	11:33	0:00	/usr/sbin/cup
root	1410	0.0	0.5	127928	19968 ?	Ssl	11:33	0:01	/usr/bin/pyth
root	1455	0.0	0.2	323428	8704 ?	Ssl	11:33	0:00	/usr/sbin/gdm
cups-br+	1471	0.0	0.4	260408	14464 ?	Ssl	11:33	0:00	/usr/sbin/cup
kernoops	1474	0.0	0.0	12520	2460 ?	Ss	11:33	0:00	/usr/sbin/ker
kernoops	1476	0.0	0.0	12520	2332 ?	Ss	11:33	0:00	/usr/sbin/ker
root	1486	0.0	0.2	250864	8960 ?	Sl	11:33	0:00	gdm-session-w
ubuntu	1503	0.1	0.3	19628	10624 ?	Ss	11:33	0:01	/lib/systemd/
ubuntu	1504	0.0	0.1	104420	6232 ?	S	11:33	0:00	(sd-pam)
ubuntu	1519	0.1	0.4	68324	14912 ?	S<sl	11:33	0:02	/usr/bin/pipe
ubuntu	1521	0.1	0.6	347712	22272 ?	S<sl	11:33	0:01	/usr/bin/wire
ubuntu	1523	0.0	0.5	52744	19616 ?	S<sl	11:33	0:01	/usr/bin/pipe

ubuntu	1524	0.0	0.2	324996	9088 ?	Ssl	11:33	0:00	/usr/bin/gnom
ubuntu	1541	0.1	0.1	10720	6016 ?	Ss	11:33	0:01	/usr/bin/dbus
rtkit	1542	0.0	0.0	22788	3200 ?	SNsl	11:33	0:00	/usr/libexec/
ubuntu	1547	0.0	0.1	244672	5504 tty2	Ssl+	11:33	0:00	/usr/libexec/
ubuntu	1549	21.4	3.2	366508	115540 tty2	Sl+	11:33	4:33	/usr/lib/xorg
ubuntu	1579	0.0	0.3	307080	13952 tty2	Sl+	11:34	0:00	/usr/libexec/
ubuntu	1666	0.0	0.2	382760	7808 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	1674	0.0	0.1	9408	4608 ?	S	11:34	0:00	/usr/bin/dbus
ubuntu	1691	0.0	0.1	162056	7040 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	1693	0.0	0.1	100432	5504 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	1698	0.0	0.1	7576	3840 ?	Ss	11:34	0:00	ssh-agent -D
ubuntu	1706	0.0	0.2	322872	7552 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	1732	0.0	0.1	454020	6400 ?	Sl	11:34	0:00	/usr/libexec/
ubuntu	1734	0.0	0.4	873444	15616 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	1773	24.5	8.5	3870776	302508 ?	Ssl	11:34	5:08	/usr/bin/gnom
ubuntu	1818	0.2	1.9	1060184	67552 ?	Sl	11:34	0:03	/usr/libexec/
ubuntu	1988	0.0	0.1	318392	6016 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	1990	0.0	0.3	654688	13952 ?	Sl	11:34	0:00	/usr/libexec/
root	2000	0.0	0.1	319100	6656 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2008	0.0	0.7	654412	25344 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2017	0.0	0.1	230012	5504 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2029	0.0	0.2	398160	9600 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2038	0.0	0.1	318668	6272 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2043	0.0	0.1	319620	6656 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2047	0.0	0.6	646108	22528 ?	Sl	11:34	0:00	/usr/libexec/
ubuntu	2052	0.0	0.1	318728	6016 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2062	0.0	0.4	899628	17024 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2066	0.0	0.2	397716	7808 ?	Sl	11:34	0:00	/usr/libexec/
ubuntu	2071	0.0	0.2	397504	7808 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2091	0.0	0.5	828624	20992 ?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2093	0.0	0.6	2535136	22540 ?	Sl	11:34	0:00	/usr/bin/gjs
ubuntu	2123	0.0	0.2	396976	8320 ?	Sl	11:34	0:00	/usr/libexec/

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ubuntu	2158	0.0	0.6	424120	21856	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2160	0.0	0.3	440828	11264	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2162	0.0	0.2	467868	7552	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2163	0.0	0.6	496708	21652	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2167	0.0	0.7	753036	26456	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2169	0.0	0.7	604372	27472	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2172	0.0	0.2	332104	10368	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2173	0.0	0.1	539976	6400	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2174	0.0	0.1	318524	6016	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2175	0.0	0.2	548252	9088	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2177	0.0	0.2	541880	7680	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2178	0.0	0.2	402548	9216	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2179	0.0	0.6	423360	21760	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2180	0.0	0.6	425368	23548	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2187	0.0	0.1	305292	6912	?	Sl	11:34	0:00	/usr/libexec/
ubuntu	2191	0.2	0.3	398820	12648	?	Sl	11:34	0:02	/usr/bin/ibus
ubuntu	2206	0.0	1.1	825124	41884	?	Sl	11:34	0:01	/usr/libexec/
ubuntu	2291	0.0	0.3	558732	12928	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2303	0.0	0.3	424376	12288	?	Sl	11:34	0:00	/usr/libexec/
ubuntu	2345	0.0	0.2	545432	7168	?	Ssl	11:34	0:00	/usr/libexec/
root	2364	0.0	0.0	2636	1792	?	Ss	11:34	0:00	fusermount3 -
ubuntu	2372	0.0	1.9	1139488	69432	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2374	0.0	0.1	245484	6272	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2405	0.0	0.6	2535132	22480	?	Sl	11:34	0:00	/usr/bin/gjs
ubuntu	2432	0.0	0.6	425148	23652	?	Ssl	11:34	0:00	/usr/libexec/
ubuntu	2493	0.0	0.1	319428	6784	?	Sl	11:34	0:00	/usr/libexec/
ubuntu	2494	0.2	0.7	355804	28072	?	Sl	11:34	0:02	/usr/libexec/
ubuntu	2499	0.0	0.6	275816	21712	?	Sl	11:34	0:00	/usr/libexec/
ubuntu	2504	0.1	0.7	748060	26128	?	SNsl	11:34	0:02	/usr/libexec/
ubuntu	2505	0.0	0.1	319376	6912	?	Sl	11:34	0:00	/usr/libexec/
ubuntu	2604	0.0	0.1	245732	6784	?	Sl	11:34	0:00	/usr/libexec/
ubuntu	2711	0.0	0.1	76456	6528	?	Ss	11:35	0:00	/snap/snapd-d

root	2910	0.0	0.0	18916	2432	?	Ss	11:35	0:00	/bin/bash /sn
root	2928	1.2	1.8	538828	63968	?	Sl	11:35	0:15	/snap/ubuntu-
ubuntu	2930	0.0	0.5	307956	18804	?	Sl	11:35	0:00	/snap/snapd-d
ubuntu	2954	0.0	1.1	632480	41256	?	Sl	11:35	0:01	/usr/bin/upda
root	2998	0.0	0.0	0	0	?	I<	11:36	0:00	[cfg80211]
root	3043	0.0	0.0	0	0	?	I<	11:36	0:00	[xfsalloc]
root	3044	0.0	0.0	0	0	?	I<	11:36	0:00	[xfs_mru_cach
root	3048	0.0	0.0	0	0	?	S	11:36	0:00	[jfsIO]
root	3049	0.0	0.0	0	0	?	S	11:36	0:00	[jfsCommit]
root	3050	0.0	0.0	0	0	?	S	11:36	0:00	[jfsCommit]
root	3051	0.0	0.0	0	0	?	S	11:36	0:00	[jfsSync]
root	4240	0.0	0.0	0	0	?	I	11:39	0:00	[kworker/0:1-
ubuntu	4330	0.2	1.4	2824988	52312	?	Sl	11:39	0:02	gjs /usr/shar
ubuntu	4387	14.0	13.5	3532556	479276	?	Sl	11:40	2:01	/snap/firefox
ubuntu	4608	0.0	1.0	218700	37632	?	Sl	11:41	0:00	/snap/firefox
ubuntu	4656	0.1	2.4	2429008	86996	?	Sl	11:41	0:01	/snap/firefox
ubuntu	4667	0.3	3.2	2438316	113308	?	Sl	11:41	0:02	/snap/firefox
ubuntu	4707	0.0	0.5	1244236	18048	?	Sl	11:41	0:00	/usr/bin/snap
ubuntu	5162	5.0	11.6	3049560	413676	?	Sl	11:41	0:41	/snap/firefox
ubuntu	5431	0.0	0.9	222032	34944	?	Sl	11:41	0:00	/snap/firefox
ubuntu	5448	0.1	2.1	2411944	77792	?	Sl	11:41	0:01	/snap/firefox
root	5529	0.4	0.0	0	0	?	I	11:42	0:03	[kworker/1:0-
ubuntu	5556	0.0	1.7	2393676	63196	?	Sl	11:42	0:00	/snap/firefox
ubuntu	5585	0.0	1.7	2394244	62388	?	Sl	11:42	0:00	/snap/firefox
ubuntu	5609	0.0	1.1	340412	41984	?	Sl	11:43	0:00	/snap/firefox
ubuntu	5643	0.0	1.7	2394240	63104	?	Sl	11:43	0:00	/snap/firefox
ubuntu	5677	1.4	3.8	2492172	136460	?	Sl	11:43	0:10	/snap/firefox
ubuntu	5968	16.1	8.7	1610492	309184	?	Sl	11:45	1:39	/usr/bin/gnom
root	6036	0.0	0.0	0	0	?	I	11:48	0:00	[kworker/0:0-
ubuntu	6079	0.0	0.2	544568	8576	?	Sl	11:52	0:00	/usr/libexec/
ubuntu	6114	0.0	0.2	399044	8448	?	Sl	11:52	0:00	/usr/libexec/
ubuntu	6129	1.3	1.4	777264	50856	?	Ssl	11:52	0:01	/usr/libexec/

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```
ubuntu 4667 0.3 3.2 2438316 113308 ? SL 11:41 0:02 /snap/firefox
ubuntu 4707 0.0 0.5 1244236 18048 ? SL 11:41 0:00 /usr/bin/snap
ubuntu 5162 5.0 11.6 3049560 413676 ? SL 11:41 0:41 /snap/firefox
ubuntu 5431 0.0 0.9 222032 34944 ? SL 11:41 0:00 /snap/firefox
ubuntu 5448 0.1 2.1 2411944 77792 ? SL 11:41 0:01 /snap/firefox
root 5529 0.4 0.0 0 0 ? I 11:42 0:03 [kworker/1:0-
ubuntu 5556 0.0 1.7 2393676 63196 ? SL 11:42 0:00 /snap/firefox
ubuntu 5585 0.0 1.7 2394244 62388 ? SL 11:42 0:00 /snap/firefox
ubuntu 5609 0.0 1.1 340412 41984 ? SL 11:43 0:00 /snap/firefox
ubuntu 5643 0.0 1.7 2394240 63104 ? SL 11:43 0:00 /snap/firefox
ubuntu 5677 1.4 3.8 2492172 136460 ? SL 11:43 0:10 /snap/firefox
ubuntu 5968 16.1 8.7 1610492 309184 ? SL 11:45 1:39 /usr/bin/gnom
root 6036 0.0 0.0 0 0 ? I 11:48 0:00 [kworker/0:0-
ubuntu 6079 0.0 0.2 544568 8576 ? SL 11:52 0:00 /usr/libexec/
ubuntu 6114 0.0 0.2 399044 8448 ? SL 11:52 0:00 /usr/libexec/
ubuntu 6129 1.3 1.4 777264 50856 ? Ssl 11:52 0:01 /usr/libexec/
ubuntu 6156 0.1 0.1 20012 4480 pts/0 Ss 11:53 0:00 bash
root 6165 0.0 0.0 0 0 ? I 11:53 0:00 [kworker/0:2-
root 6416 0.0 0.0 0 0 ? I 11:54 0:00 [kworker/u4:0
root 6417 0.9 0.0 0 0 ? I 11:54 0:00 [kworker/u4:1
root 6496 0.4 0.5 382284 20384 ? Ssl 11:54 0:00 /usr/libexec/
ubuntu 6554 0.0 0.0 2616 1152 pts/0 S+ 11:55 0:00 ./a.out
ubuntu 6555 0.0 0.0 0 0 pts/0 Z+ 11:55 0:00 [a.out] <defu
ubuntu 6556 0.0 0.0 2732 1536 pts/0 S+ 11:55 0:00 sh -c ps -aux
ubuntu 6557 300 0.1 24472 5504 pts/0 R+ 11:55 0:00 ps -aux

Welcome to Parent process
parent process id 6554

Unsorted Array : 8 5 7 6 3
Quick sort :: Sorted array in ascending order : 3 5 6 7 8
ubuntu@ubuntu:~/Desktop$
```

//ORPHAN STATE

```
#include <stdio.h>
#include <sys/types.h>
#include <sys/wait.h>
#include <stdlib.h>
#include <unistd.h>
```

// bubble sort

```
void bubbleSort(int array[], int size)
{
    for (int step = 0; step < size - 1; ++step)
    {
        for (int i = 0; i < size - step - 1; ++i)
        {
            if (array[i] > array[i + 1])
            {
                int temp = array[i];
                array[i] = array[i + 1];
                array[i + 1] = temp;
            }
        }
    }
}
```

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```
        }
    }
}

void printArray_bubble(int array[], int size)
{
    for (int i = 0; i < size; ++i)
    {
        printf("%d ", array[i]);
    }
}

// quick sort
void swap(int *a, int *b)
{
    int t = *a;
    *a = *b;
    *b = t;
}

int partition(int array[], int low, int high)
{
    int pivot = array[high];
    int i = (low - 1);
    for (int j = low; j < high; j++)
    {
        if (array[j] <= pivot)
        {
            i++;
            swap(&array[i], &array[j]);
        }
    }
    swap(&array[i + 1], &array[high]);
    return (i + 1);
}

void quickSort(int array[], int low, int high)
{
    if (low < high)
    {
        int pi = partition(array, low, high);
        quickSort(array, low, pi - 1);
        quickSort(array, pi + 1, high);
    }
}
```


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```
void printArray_quick(int array[], int size)
{
    for (int i = 0; i < size; ++i)
    {
        printf("%d ", array[i]);
    }
    printf("\n");
}

void main()
{
    int data[] = {8, 5, 7, 6, 3};
    int size = sizeof(data) / sizeof(data[0]);
    int pid, status;
    pid = fork();

    if (pid == 0)
    {
        printf("\n Child's parent process id %d \n", getppid());
        sleep(3);
        printf("\n Welcome to child process \n");
        printf("\n Child process id %d \n", getpid());
        printf("\n Child's parent process id %d \n", getppid());

        printf("\n Unsorted Array : ");
        printArray_quick(data, size);
        bubbleSort(data, size);

        printf(" Bubble Sort :: Sorted Array in Ascending Order : ");
        printArray_bubble(data, size);
        printf("\n\n");
    }
    else if (pid != 0)
    {
        printf("\n Welcome to Parent process \n");
        printf("\n parent process id %d \n", getpid());

        printf("\n Unsorted Array : ");
        printArray_quick(data, size);
        quickSort(data, 0, size - 1);

        printf(" Quick sort :: Sorted array in ascending order : ");
        printArray_quick(data, size);
    }
}
```

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```
ubuntu@ubuntu:~/Desktop$ gcc orphan.c
ubuntu@ubuntu:~/Desktop$ ./a.out

Welcome to Parent process

parent process id 7310

Unsorted Array : 8 5 7 6 3
Quick sort :: Sorted array in ascending order : 3 5 6 7 8
ubuntu@ubuntu:~/Desktop$
Child's parent process id 1503

Welcome to child process

Child process id 7311

Child's parent process id 1503

Unsorted Array : 8 5 7 6 3
Bubble Sort :: Sorted Array in Ascending Order : 3 5 6 7 8
```

//Wait demo on Zombie state

```
#include <stdio.h>
#include <sys/types.h>
#include <sys/wait.h>
#include <stdlib.h>
#include <unistd.h>
```

// bubble sort

```
void bubbleSort(int array[], int size)
{
    for (int step = 0; step < size - 1; ++step)
    {
        for (int i = 0; i < size - step - 1; ++i)
        {
            if (array[i] > array[i + 1])
            {
                int temp = array[i];
                array[i] = array[i + 1];
                array[i + 1] = temp;
            }
        }
    }
}
```

```
void printArray_bubble(int array[], int size)
{
    for (int i = 0; i < size; ++i)
    {
```

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```
        printf("%d ", array[i]);
    }
}

// quick sort
void swap(int *a, int *b)
{
    int t = *a;
    *a = *b;
    *b = t;
}

int partition(int array[], int low, int high)
{
    int pivot = array[high];
    int i = (low - 1);

    for (int j = low; j < high; j++)
    {
        if (array[j] <= pivot)
        {
            i++;
            swap(&array[i], &array[j]);
        }
    }

    swap(&array[i + 1], &array[high]);
    return (i + 1);
}

void quickSort(int array[], int low, int high)
{
    if (low < high)
    {
        int pi = partition(array, low, high);
        quickSort(array, low, pi - 1);
        quickSort(array, pi + 1, high);
    }
}

void printArray_quick(int array[], int size)
{
    for (int i = 0; i < size; ++i)
    {
        printf("%d ", array[i]);
    }
    printf("\n");
}
```

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```
}

int main()
{
    int data[] = {8, 5, 7, 6, 3};
    int size = sizeof(data) / sizeof(data[0]);

    int pid, status;
    pid_t w1;
    pid = fork();

    if (pid == 0)
    {
        printf("\n Welcome to child process");
        printf("\n Child process id %d \n", getpid());
        printf("\n Child's parent process id %d \n", getppid());

        printf("\n Unsorted Array : ");
        printArray_quick(data, size);
        bubbleSort(data, size);

        printf(" Bubble Sort :: Sorted Array in Ascending Order : ");
        printArray_bubble(data, size);
        printf("\n\n");
    }
    else if (pid != 0)
    {
        w1 = wait(&status);
        printf("\n Status is %d \n", WEXITSTATUS(status));
        printf(" Return value of wait,w1=%d \n", w1);

        printf("\n");
        sleep(5);
        system("ps -aux");
        printf("\n Welcome to Parent process");
        printf("\n parent process id %d \n", getpid());

        printf("\n Unsorted Array : ");
        printArray_quick(data, size);
        quickSort(data, 0, size - 1);

        printf(" Quick sort :: Sorted array in ascending order : ");
        printArray_quick(data, size);
    }
}
```

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```
ubuntu@ubuntu:~/Desktop$ gcc WaitdemonZombiestate.c
ubuntu@ubuntu:~/Desktop$ ./a.out
```

```
Welcome to child process
Child process id 7640
```

```
Child's parent process id 7639
```

```
Unsorted Array : 8 5 7 6 3
```

```
Bubble Sort :: Sorted Array in Ascending Order : 3 5 6 7 8
```

```
Status is 0
```

```
Return value of wait,w1=7640
```

USER	PID	%CPU	%MEM	VSZ	RSS	TTY	STAT	START	TIME	COMMAND
root	1	0.1	0.2	104360	9900	?	Ss	11:33	0:09	/sbin/init --- splash
root	2	0.0	0.0	0	0	?	S	11:33	0:00	[kthreadd]
root	3	0.0	0.0	0	0	?	I<	11:33	0:00	[rcu_gp]
root	4	0.0	0.0	0	0	?	I<	11:33	0:00	[rcu_par_gp]
root	5	0.0	0.0	0	0	?	I<	11:33	0:00	[slub_flushwq]
root	6	0.0	0.0	0	0	?	I<	11:33	0:00	[netns]
root	8	0.0	0.0	0	0	?	I<	11:33	0:00	[kworker/0:0H-events_highpri]
root	10	0.0	0.0	0	0	?	I<	11:33	0:00	[mm_percpu_wq]
root	11	0.0	0.0	0	0	?	I	11:33	0:00	[rcu_tasks_kthread]
root	12	0.0	0.0	0	0	?	I	11:33	0:00	[rcu_tasks_rude_kthread]
root	13	0.0	0.0	0	0	?	I	11:33	0:00	[rcu_tasks_trace_kthread]
root	14	0.2	0.0	0	0	?	S	11:33	0:12	[ksoftirqd/0]
root	15	0.3	0.0	0	0	?	I	11:33	0:15	[rcu_preempt]
root	16	0.0	0.0	0	0	?	S	11:33	0:00	[migration/0]
root	17	0.0	0.0	0	0	?	S	11:33	0:00	[idle_inject/0]
root	19	0.0	0.0	0	0	?	S	11:33	0:00	[cpuhp/0]
root	20	0.0	0.0	0	0	?	S	11:33	0:00	[cpuhp/1]
root	21	0.0	0.0	0	0	?	S	11:33	0:00	[idle_inject/1]

root	22	0.0	0.0	0	0	?	S	11:33	0:01	[migration/1]
root	23	0.2	0.0	0	0	?	S	11:33	0:10	[ksoftirqd/1]
root	25	0.0	0.0	0	0	?	I<	11:33	0:00	[kworker/1:0H-events_highpri]
root	26	0.0	0.0	0	0	?	S	11:33	0:00	[kdevtmpfs]
root	27	0.0	0.0	0	0	?	I<	11:33	0:00	[inet_frag_wq]
root	28	0.0	0.0	0	0	?	S	11:33	0:00	[kauditd]
root	29	0.0	0.0	0	0	?	S	11:33	0:00	[khungtaskd]
root	31	0.0	0.0	0	0	?	S	11:33	0:00	[oom_reaper]
root	33	0.0	0.0	0	0	?	I<	11:33	0:00	[writeback]
root	34	0.0	0.0	0	0	?	S	11:33	0:01	[kcompactd0]
root	35	0.0	0.0	0	0	?	SN	11:33	0:00	[ksmd]
root	37	0.0	0.0	0	0	?	SN	11:33	0:00	[khugepaged]
root	38	0.0	0.0	0	0	?	I<	11:33	0:00	[kintegrityd]
root	39	0.0	0.0	0	0	?	I<	11:33	0:00	[kblockd]
root	40	0.0	0.0	0	0	?	I<	11:33	0:00	[blkcg_punt_bio]
root	41	0.0	0.0	0	0	?	I<	11:33	0:00	[tpm_dev_wq]
root	42	0.0	0.0	0	0	?	I<	11:33	0:00	[ata_sff]
root	43	0.0	0.0	0	0	?	I<	11:33	0:00	[md]
root	44	0.0	0.0	0	0	?	I<	11:33	0:00	[edac-poller]
root	45	0.0	0.0	0	0	?	I<	11:33	0:00	[devfreq_wq]
root	46	0.0	0.0	0	0	?	S	11:33	0:00	[watchdogd]
root	47	0.6	0.0	0	0	?	I<	11:33	0:28	[kworker/1:1H-kblockd]
root	48	0.2	0.0	0	0	?	S	11:33	0:10	[kswapd0]
root	49	0.0	0.0	0	0	?	S	11:33	0:00	[ecryptfs-kthread]
root	50	0.0	0.0	0	0	?	I<	11:33	0:00	[kthrotld]
root	51	0.0	0.0	0	0	?	I<	11:33	0:00	[acpi_thermal_pm]
root	52	0.0	0.0	0	0	?	S	11:33	0:00	[xenbus_probe]
root	53	0.0	0.0	0	0	?	S	11:33	0:00	[scsi_eh_0]
root	54	0.0	0.0	0	0	?	I<	11:33	0:00	[scsi_tmf_0]
root	55	0.0	0.0	0	0	?	S	11:33	0:00	[scsi_eh_1]
root	56	0.0	0.0	0	0	?	I<	11:33	0:00	[scsi_tmf_1]
root	60	0.0	0.0	0	0	?	I<	11:33	0:00	[mld]

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```
root      62 0.0 0.0      0 0 ?      I< 11:33 0:02 [kworker/0:1H-kblockd]
root      63 0.0 0.0      0 0 ?      I< 11:33 0:00 [ipv6_addrconf]
root      70 0.0 0.0      0 0 ?      I< 11:33 0:00 [kstrp]
root      72 0.0 0.0      0 0 ?      I< 11:33 0:00 [zswap-shrink]
root      73 0.0 0.0      0 0 ?      I< 11:33 0:00 [kworker/u5:0]
root      77 0.0 0.0      0 0 ?      I< 11:33 0:00 [charger_manager]
root     132 0.0 0.0      0 0 ?      I< 11:33 0:00 [cryptd]
root     138 0.0 0.0      0 0 ?      S  11:33 0:00 [scsi_eh_2]
root     139 0.0 0.0      0 0 ?      I< 11:33 0:00 [scsi_tmf_2]
root     148 0.0 0.0      0 0 ?      S  11:33 0:00 [irq/18-vmwgfx]
root     832 0.0 0.1  49792 7052 ?    S<S 11:33 0:02 /lib/systemd/systemd-journald
root     868 0.0 0.1  28488 3992 ?    Ss  11:33 0:01 /lib/systemd/systemd-udev
root    1010 0.0 0.0      0 0 ?      S< 11:33 0:00 [spl_system_task]
root    1011 0.0 0.0      0 0 ?      S< 11:33 0:00 [spl_delay_taskq]
root    1012 0.0 0.0      0 0 ?      S< 11:33 0:00 [spl_dynamic_tas]
root    1013 0.0 0.0      0 0 ?      S< 11:33 0:00 [spl_kmem_cache]
root    1014 0.0 0.0      0 0 ?      S< 11:33 0:00 [zvol]
root    1015 0.0 0.0      0 0 ?      S  11:33 0:00 [arc_prune]
root    1016 0.0 0.0      0 0 ?      S  11:33 0:00 [arc_evict]
root    1017 0.0 0.0      0 0 ?      SN 11:33 0:00 [arc_reap]
root    1018 0.0 0.0      0 0 ?      S  11:33 0:00 [dbu_evict]
root    1019 0.0 0.0      0 0 ?      SN 11:33 0:00 [dbuf_evict]
root    1020 0.0 0.0      0 0 ?      SN 11:33 0:00 [z_vdev_file]
root    1021 0.0 0.0      0 0 ?      S  11:33 0:00 [l2arc_feed]
systemd+ 1086 0.2 0.0  16204 2176 ?    Ss  11:33 0:10 /lib/systemd/systemd-oomd
systemd+ 1087 0.0 0.1  20368 4608 ?    Ss  11:33 0:02 /lib/systemd/systemd-resolved
systemd+ 1088 0.0 0.0  89692 2048 ?    Ssl 11:33 0:00 /lib/systemd/systemd-timesyncd
avahi    1305 0.0 0.0   8472 1152 ?    Ss  11:33 0:00 avahi-daemon: running [ubuntu.local]
message+ 1306 0.0 0.1  11896 3712 ?    Ss  11:33 0:02 @dbus-daemon --system --address=systemd: --nofork --
root     1310 0.0 0.0  82756 1280 ?    Ssl 11:33 0:00 /usr/sbin/irqbalance --foreground
root     1324 0.0 0.1 310048 4548 ?    Ssl 11:33 0:00 /usr/libexec/polkitd --no-debug
root     1326 0.0 0.0 322260 2432 ?    Ssl 11:33 0:00 /usr/libexec/power-profiles-daemon
```

```
root     1329 0.3 0.6 1401032 23248 ?    Ssl 11:33 0:15 /usr/lib/napd/napd
root     1335 0.0 0.0 322164 2520 ?      Ssl 11:33 0:00 /usr/libexec/accounts-daemon
root     1340 0.0 0.0  18412  768 ?      Ss  11:33 0:00 /usr/sbin/cron -f -P
root     1342 0.0 0.0 318688 2176 ?      Ssl 11:33 0:00 /usr/libexec/switcheroo-control
root     1343 0.0 0.0  24940 2688 ?      Ss  11:33 0:00 /lib/systemd/systemd-logind
root     1344 0.0 0.1  466188 4028 ?      Ssl 11:33 0:01 /usr/libexec/udisks2/udisksd
root     1346 0.0 0.0  166720 1920 ?      Ssl 11:33 0:00 /usr/sbin/zed -F
avahi    1349 0.0 0.0   8284  784 ?      S  11:33 0:00 avahi-daemon: chroot helper
root     1350 0.0 0.1 343300 5696 ?      Ssl 11:33 0:02 /usr/sbin/NetworkManager --no-daemon
root     1351 0.0 0.0  16460 1664 ?      Ss  11:33 0:00 /sbin/wpa_supplicant -u -s -O DIR=/run/wpa_supplicant
root     1373 0.0 0.1 317176 3668 ?      Ssl 11:33 0:00 /usr/sbin/ModemManager
syslog   1381 0.0 0.0  222352 2432 ?      Ssl 11:33 0:00 /usr/sbin/rsyslogd -n -iNONE
root     1407 0.0 0.1  46204 3584 ?      Ss  11:33 0:00 /usr/sbin/cupsd -l
root     1410 0.0 0.3 127928 11648 ?     Ssl 11:33 0:01 /usr/bin/python3 /usr/share/unattended-upgrades/unat
root     1455 0.0 0.0 323428 2816 ?      Ssl 11:33 0:00 /usr/sbin/gdm3
cups-br+ 1471 0.0 0.1 260408 4352 ?      Ssl 11:33 0:00 /usr/sbin/cups-browsed
kernoops 1474 0.0 0.0  12520 1564 ?      Ss  11:33 0:00 /usr/sbin/kerneloops --test
kernoops 1476 0.0 0.0  12520 1564 ?      Ss  11:33 0:00 /usr/sbin/kerneloops
root     1486 0.0 0.0 250864 2688 ?      Sl  11:33 0:00 gdm-session-worker [pam/gdm-autologin]
ubuntu   1503 0.0 0.1  19632 6400 ?      Ss  11:33 0:03 /lib/systemd/systemd --user
ubuntu   1504 0.0 0.1 104420 5080 ?      S  11:33 0:00 (sd-pam)
ubuntu   1523 0.0 0.4  59136 14520 ?     S<sl 11:33 0:02 /usr/bin/pipewire-pulse
ubuntu   1524 0.0 0.0 324996 2688 ?      Ssl 11:33 0:00 /usr/bin/gnome-keyring-daemon --foreground --compone
ubuntu   1541 0.0 0.0  11144 3456 ?      Ss  11:33 0:03 /usr/bin/dbus-daemon --session --address=systemd: --
rtkit    1542 0.0 0.0  22788 1152 ?      SNsl 11:33 0:00 /usr/libexec/rtkit-daemon
ubuntu   1547 0.0 0.0 244672 1920 tty2    Ssl+ 11:33 0:00 /usr/libexec/gdm-x-session --run-script env GNOME_SH
ubuntu   1549 19.2 6.5 1479700 230568 tty2    Sl+  11:33 14:50 /usr/lib/xorg/Xorg vt2 -displayfd 3 -auth /run/user/
ubuntu   1579 0.0 0.1 307080 3968 tty2    Sl+  11:34 0:00 /usr/libexec/gnome-session-binary --session=ubuntu
ubuntu   1666 0.0 0.0 382760 2688 ?      Ssl 11:34 0:00 /usr/libexec/at-spi-bus-launcher
ubuntu   1674 0.0 0.0   9408 1792 ?      S  11:34 0:00 /usr/bin/dbus-daemon --config-file=/usr/share/defaul
ubuntu   1691 0.0 0.0 162056 2176 ?      Ssl 11:34 0:00 /usr/libexec/gcr-ssh-agent /run/user/1000/gcr
ubuntu   1693 0.0 0.0 100432 1664 ?      Ssl 11:34 0:00 /usr/libexec/gnome-session-ctl --monitor
```

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ubuntu	1698	0.0	0.0	7576	1280 ?	Ss	11:34	0:00	ssh-agent -D -a /run/user/1000/openssh_agent
ubuntu	1706	0.0	0.1	322872	3584 ?	Ssl	11:34	0:00	/usr/libexec/gvfsd
ubuntu	1732	0.0	0.0	454020	2560 ?	Sl	11:34	0:00	/usr/libexec/gvfsd-fuse /run/user/1000/gvfs -f
ubuntu	1734	0.0	0.1	873444	5248 ?	Ssl	11:34	0:00	/usr/libexec/gnome-session-binary --systemd-service
ubuntu	1773	21.7	9.9	3960440	350480 ?	Ssl	11:34	16:43	/usr/bin/gnome-shell
ubuntu	1818	0.2	2.9	1271632	106028 ?	Sl	11:34	0:12	/usr/libexec/mutter-x11-frames
ubuntu	1988	0.0	0.0	318392	2048 ?	Ssl	11:34	0:00	/usr/libexec/xdg-permission-store
ubuntu	1990	0.0	0.1	654688	4608 ?	Sl	11:34	0:00	/usr/libexec/gnome-shell-calendar-server
root	2000	0.0	0.0	319100	2432 ?	Ssl	11:34	0:00	/usr/libexec/upowerd
ubuntu	2008	0.0	0.3	1195092	10880 ?	Ssl	11:34	0:01	/usr/libexec/evolution-source-registry
ubuntu	2017	0.0	0.0	230132	2176 ?	Ssl	11:34	0:00	/usr/libexec/dconf-service
ubuntu	2029	0.0	0.1	398160	3584 ?	Ssl	11:34	0:00	/usr/libexec/gvfs-udisks2-volume-monitor
ubuntu	2038	0.0	0.0	318668	2432 ?	Ssl	11:34	0:00	/usr/libexec/gvfs-mtp-volume-monitor
ubuntu	2043	0.0	0.0	319620	2560 ?	Ssl	11:34	0:00	/usr/libexec/gvfs-gphoto2-volume-monitor
ubuntu	2047	0.0	0.2	646108	9216 ?	Sl	11:34	0:00	/usr/libexec/goa-daemon
ubuntu	2052	0.0	0.0	318728	2304 ?	Ssl	11:34	0:00	/usr/libexec/gvfs-goa-volume-monitor
ubuntu	2062	0.0	0.1	907960	5504 ?	Ssl	11:34	0:00	/usr/libexec/evolution-calendar-factory
ubuntu	2066	0.0	0.0	397716	2560 ?	Sl	11:34	0:00	/usr/libexec/goa-identity-service
ubuntu	2071	0.0	0.0	397504	2816 ?	Ssl	11:34	0:00	/usr/libexec/gvfs-afc-volume-monitor
ubuntu	2091	0.0	0.1	828624	5888 ?	Ssl	11:34	0:00	/usr/libexec/evolution-addressbook-factory
ubuntu	2093	0.0	0.2	2535136	8460 ?	Sl	11:34	0:00	/usr/bin/gjs /usr/share/gnome-shell/org.gnome.Shell.
ubuntu	2123	0.0	0.1	396976	4480 ?	Sl	11:34	0:00	/usr/libexec/gvfsd-trash --spawner :1.18 /org/gtk/gv
ubuntu	2142	0.0	0.0	235840	2816 ?	Sl	11:34	0:02	/usr/libexec/at-spi2-registrard --use-gnome-session
colord	2143	0.0	0.1	327736	5448 ?	Ssl	11:34	0:00	/usr/libexec/colord
ubuntu	2151	0.0	0.0	2732	512 ?	Ss	11:34	0:00	sh -c /usr/bin/ibus-daemon --panel disable \${["\$XDG
ubuntu	2155	0.0	0.0	392524	2304 ?	Ssl	11:34	0:00	/usr/libexec/gsd-a11y-settings
ubuntu	2158	0.0	0.2	424120	10208 ?	Ssl	11:34	0:00	/usr/libexec/gsd-color
ubuntu	2160	0.0	0.0	440828	3456 ?	Ssl	11:34	0:00	/usr/libexec/gsd-datetime
ubuntu	2162	0.0	0.0	467868	2944 ?	Ssl	11:34	0:00	/usr/libexec/gsd-housekeeping
ubuntu	2163	0.0	0.2	496708	10132 ?	Ssl	11:34	0:00	/usr/libexec/gsd-keyboard
ubuntu	2167	0.0	0.3	753036	11352 ?	Ssl	11:34	0:00	/usr/libexec/gsd-media-keys
ubuntu	2169	0.0	0.3	604372	11344 ?	Ssl	11:34	0:00	/usr/libexec/gsd-power

ubuntu	2172	0.0	0.0	332104	3456 ?	Ssl	11:34	0:00	/usr/libexec/gsd-print-notifications
ubuntu	2173	0.0	0.0	539976	2432 ?	Ssl	11:34	0:00	/usr/libexec/gsd-rfkill
ubuntu	2174	0.0	0.0	318524	2048 ?	Ssl	11:34	0:00	/usr/libexec/gsd-screensaver-proxy
ubuntu	2175	0.0	0.0	548252	3072 ?	Ssl	11:34	0:00	/usr/libexec/gsd-sharing
ubuntu	2177	0.0	0.0	541880	2560 ?	Ssl	11:34	0:00	/usr/libexec/gsd-smartcard
ubuntu	2178	0.0	0.0	402548	3200 ?	Ssl	11:34	0:00	/usr/libexec/gsd-sound
ubuntu	2179	0.0	0.2	423360	10240 ?	Ssl	11:34	0:00	/usr/libexec/gsd-wacom
ubuntu	2180	0.0	0.3	425368	11132 ?	Ssl	11:34	0:00	/usr/libexec/gsd-xsettings
ubuntu	2187	0.0	0.0	305292	2688 ?	Sl	11:34	0:00	/usr/libexec/gsd-disk-utility-notify
ubuntu	2191	0.1	0.2	398820	10088 ?	Sl	11:34	0:08	/usr/bin/ibus-daemon --panel disable --xim
ubuntu	2206	0.0	0.5	825128	18972 ?	Sl	11:34	0:01	/usr/libexec/evolution-data-server/evolution-alarm-n
ubuntu	2291	0.0	0.1	696676	5916 ?	Ssl	11:34	0:01	/usr/libexec/xdg-desktop-portal
ubuntu	2303	0.0	0.1	424376	4096 ?	Sl	11:34	0:00	/usr/libexec/gsd-printer
ubuntu	2345	0.0	0.1	619164	3712 ?	Ssl	11:34	0:00	/usr/libexec/xdg-document-portal
root	2364	0.0	0.0	2636	640 ?	Ss	11:34	0:00	fusermount3 -o rw,nosuid,nodev,fsname=portal,auto_un
ubuntu	2372	0.1	2.3	1431344	83464 ?	Ssl	11:34	0:08	/usr/libexec/xdg-desktop-portal-gnome
ubuntu	2374	0.0	0.0	245484	2432 ?	Ssl	11:34	0:00	/usr/libexec/gvfsd-metadata
ubuntu	2405	0.0	0.2	2535132	8784 ?	Sl	11:34	0:00	/usr/bin/gjs /usr/share/gnome-shell/org.gnome.Screen
ubuntu	2432	0.0	0.3	425156	11236 ?	Ssl	11:34	0:00	/usr/libexec/xdg-desktop-portal-gtk
ubuntu	2493	0.0	0.0	319428	2048 ?	Sl	11:34	0:00	/usr/libexec/ibus-dconf
ubuntu	2494	0.0	0.4	355804	16424 ?	Sl	11:34	0:03	/usr/libexec/ibus-extension-gtk3
ubuntu	2499	0.0	0.2	275816	9808 ?	Sl	11:34	0:00	/usr/libexec/ibus-x11 --kill-daemon
ubuntu	2504	0.0	0.5	887328	20232 ?	SNsl	11:34	0:03	/usr/libexec/tracker-miner-fs-3
ubuntu	2505	0.0	0.0	319376	2048 ?	Sl	11:34	0:00	/usr/libexec/ibus-portal
ubuntu	2604	0.0	0.0	245732	2432 ?	Sl	11:34	0:01	/usr/libexec/ibus-engine-simple
ubuntu	2711	0.0	0.0	76456	2176 ?	Ss	11:35	0:00	/snap/snapd-desktop-integration/83/usr/bin/snapd-des
root	2910	0.0	0.0	18916	896 ?	Ss	11:35	0:00	/bin/bash /snap/ubuntu-desktop-installer/939/bin/sub
root	2928	0.3	1.6	687316	59616 ?	Sl	11:35	0:16	/snap/ubuntu-desktop-installer/939/usr/bin/python3.1
ubuntu	2930	0.0	0.2	307956	9844 ?	Sl	11:35	0:00	/snap/snapd-desktop-integration/83/usr/bin/snapd-des
ubuntu	2954	0.0	0.4	632484	14376 ?	Sl	11:35	0:01	/usr/bin/update-notifier
root	2998	0.0	0.0	0	0 ?	I<	11:36	0:00	[cfg80211]
root	3043	0.0	0.0	0	0 ?	I<	11:36	0:00	[xfsalloc]

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```
root      3044 0.0 0.0 0 0 ? I< 11:36 0:00 [xfs_mru_cache]
root      3048 0.0 0.0 0 0 ? S 11:36 0:00 [jfsIO]
root      3049 0.0 0.0 0 0 ? S 11:36 0:00 [jfsCommit]
root      3050 0.0 0.0 0 0 ? S 11:36 0:00 [jfsCommit]
root      3051 0.0 0.0 0 0 ? S 11:36 0:00 [jfsSync]
ubuntu    4387 5.8 9.5 3472180 338524 ? SL 11:40 4:07 /snap/firefox/2517/usr/lib/firefox/firefox
ubuntu    4608 0.0 0.4 218700 17024 ? SL 11:41 0:00 /snap/firefox/2517/usr/lib/firefox/firefox -contentp
ubuntu    4656 0.0 1.3 2429008 46888 ? SL 11:41 0:01 /snap/firefox/2517/usr/lib/firefox/firefox -contentp
ubuntu    4667 0.1 1.8 2441548 64244 ? SL 11:41 0:05 /snap/firefox/2517/usr/lib/firefox/firefox -contentp
ubuntu    4707 0.0 0.1 1244492 6528 ? SL 11:41 0:00 /usr/bin/snap userd
ubuntu    5162 2.4 13.4 3251888 476440 ? SL 11:41 1:43 /snap/firefox/2517/usr/lib/firefox/firefox -contentp
ubuntu    5431 0.0 0.4 222032 15360 ? SL 11:41 0:00 /snap/firefox/2517/usr/lib/firefox/firefox -contentp
ubuntu    5448 0.1 1.1 2411944 39700 ? SL 11:41 0:05 /snap/firefox/2517/usr/lib/firefox/firefox -contentp
root      5529 0.3 0.0 0 0 ? I 11:42 0:15 [kworker/1:0-ata_sff]
ubuntu    5609 0.0 0.4 340412 17408 ? SL 11:43 0:00 /snap/firefox/2517/usr/lib/firefox/firefox -contentp
ubuntu    6079 0.0 0.1 544696 4608 ? SL 11:52 0:00 /usr/libexec/gvfsd-network --spawner :1.18 /org/gtk/
ubuntu    6114 0.0 0.0 399044 2816 ? SL 11:52 0:00 /usr/libexec/gvfsd-dnssd --spawner :1.18 /org/gtk/gv
ubuntu    6129 0.2 0.8 778028 29608 ? Ssl 11:52 0:09 /usr/libexec/gnome-terminal-server
ubuntu    6156 0.0 0.0 20012 2944 pts/0 Ss 11:53 0:00 bash
ubuntu    6594 0.1 0.0 97276 1920 ? SL 11:56 0:04 /usr/lib/libreoffice/program/oosplash --writer
ubuntu    6633 2.7 8.9 2637192 315924 ? SL 11:56 1:28 /usr/lib/libreoffice/program/soffice.bin --writer
root      6708 0.0 0.0 0 0 ? I 11:59 0:00 [kworker/1:2-inet_frag_wq]
ubuntu    6864 0.0 0.1 65740 6172 ? S<sl 12:03 0:01 /usr/bin/pipewire
ubuntu    6865 0.0 0.3 347152 12800 ? S<sl 12:03 0:00 /usr/bin/wireplumber
ubuntu    7075 0.1 1.0 2826568 36320 ? SL 12:16 0:03 gjs /usr/share/gnome-shell/extensions/ding@rastersof
root      7142 0.3 0.0 0 0 ? I 12:16 0:06 [kworker/u4:1-loop5]
ubuntu    7154 10.7 5.9 1606860 211672 ? SL 12:16 3:41 /usr/bin/gnome-text-editor --gapplication-service
root      7300 0.1 0.0 0 0 ? I 12:26 0:02 [kworker/0:3-events]
root      7317 0.7 0.0 0 0 ? I 12:27 0:10 [kworker/u4:0-loop0]
root      7395 0.0 0.0 0 0 ? I 12:34 0:00 [kworker/0:1-events]
root      7397 0.8 0.0 0 0 ? I 12:34 0:08 [kworker/u4:2-loop0]
root      7440 0.0 0.0 0 0 ? I 12:43 0:00 [kworker/u4:3]
```

```
ubuntu    6156 0.0 0.0 20012 2944 pts/0 Ss 11:53 0:00 bash
ubuntu    6594 0.1 0.0 97276 1920 ? SL 11:56 0:04 /usr/lib/libreoffice/program/oosplash --writer
ubuntu    6633 2.7 8.9 2637192 315924 ? SL 11:56 1:28 /usr/lib/libreoffice/program/soffice.bin --writer
root      6708 0.0 0.0 0 0 ? I 11:59 0:00 [kworker/1:2-inet_frag_wq]
ubuntu    6864 0.0 0.1 65740 6172 ? S<sl 12:03 0:01 /usr/bin/pipewire
ubuntu    6865 0.0 0.3 347152 12800 ? S<sl 12:03 0:00 /usr/bin/wireplumber
ubuntu    7075 0.1 1.0 2826568 36320 ? SL 12:16 0:03 gjs /usr/share/gnome-shell/extensions/ding@rastersof
root      7142 0.3 0.0 0 0 ? I 12:16 0:06 [kworker/u4:1-loop5]
ubuntu    7154 10.7 5.9 1606860 211672 ? SL 12:16 3:41 /usr/bin/gnome-text-editor --gapplication-service
root      7300 0.1 0.0 0 0 ? I 12:26 0:02 [kworker/0:3-events]
root      7317 0.7 0.0 0 0 ? I 12:27 0:10 [kworker/u4:0-loop0]
root      7395 0.0 0.0 0 0 ? I 12:34 0:00 [kworker/0:1-events]
root      7397 0.8 0.0 0 0 ? I 12:34 0:08 [kworker/u4:2-loop0]
root      7440 0.0 0.0 0 0 ? I 12:43 0:00 [kworker/u4:3]
root      7462 1.0 0.0 0 0 ? I 12:47 0:02 [kworker/1:1-events]
root      7463 0.0 0.0 0 0 ? I 12:47 0:00 [kworker/1:3-events]
root      7477 4.2 0.0 0 0 ? I 12:48 0:07 [kworker/u4:4-events_power_efficient]
root      7488 0.0 0.0 0 0 ? I 12:48 0:00 [kworker/u4:5]
root      7489 0.7 0.0 0 0 ? I 12:48 0:01 [kworker/0:0-ata_sff]
root      7517 0.0 0.0 0 0 ? I 12:48 0:00 [kworker/0:2]
ubuntu    7562 0.2 0.2 470564 7168 ? SL 12:49 0:00 /usr/libexec/gvfsd-recent --spawner :1.18 /org/gtk/g
ubuntu    7633 11.9 0.7 476368 27636 ? Ssl 12:50 0:01 /usr/libexec/tracker-extract-3
ubuntu    7639 0.0 0.0 2616 1152 pts/0 S+ 12:51 0:00 ./a.out
ubuntu    7641 6.2 0.0 2732 1536 pts/0 S+ 12:51 0:00 sh -c ps -aux
ubuntu    7642 71.4 0.1 24476 5248 pts/0 R+ 12:51 0:00 ps -aux
```

```
Welcome to Parent process
parent process id 7639
```

```
Unsorted Array : 8 5 7 6 3
Quick sort :: Sorted array in ascending order : 3 5 6 7 8
ubuntu@ubuntu:~/Desktop$
```