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ASSIGNMENT NO. 2a

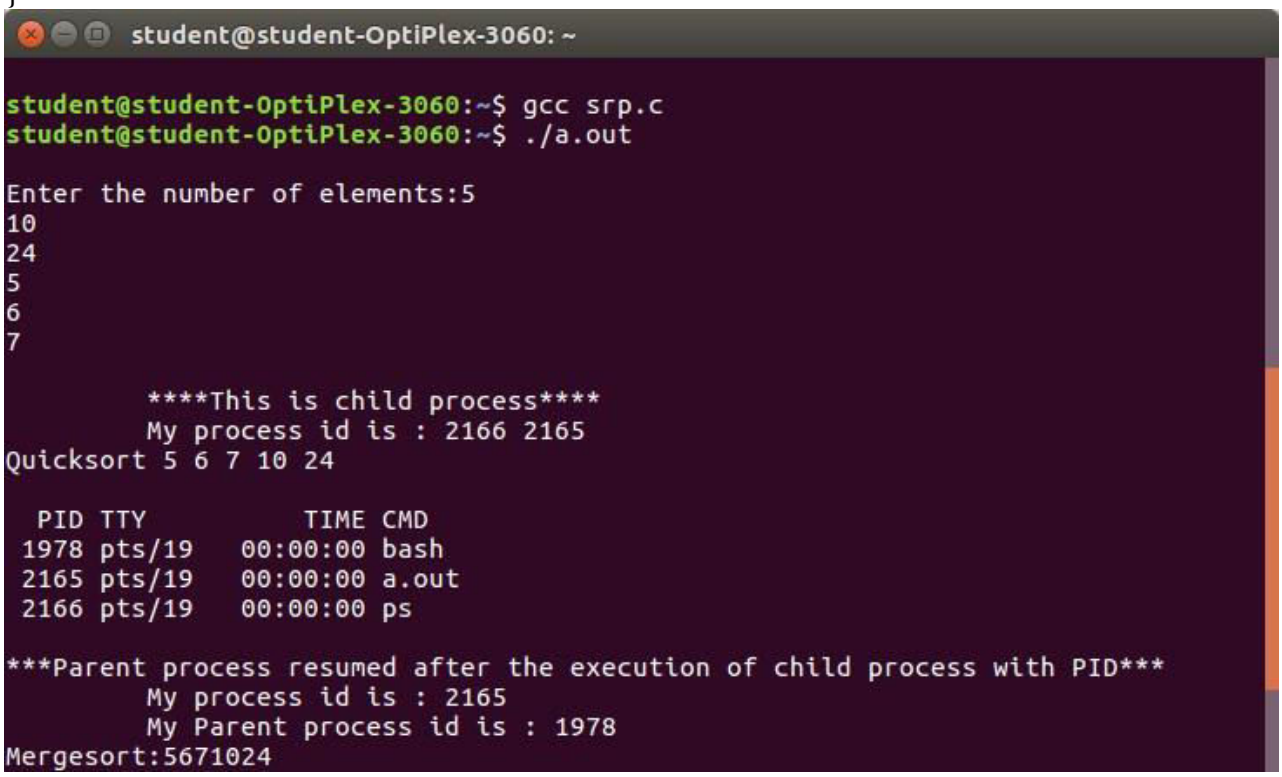
TITLE: Process control system calls: The demonstration of FORK, EXECVE and WAIT system calls along with zombie and orphan states.

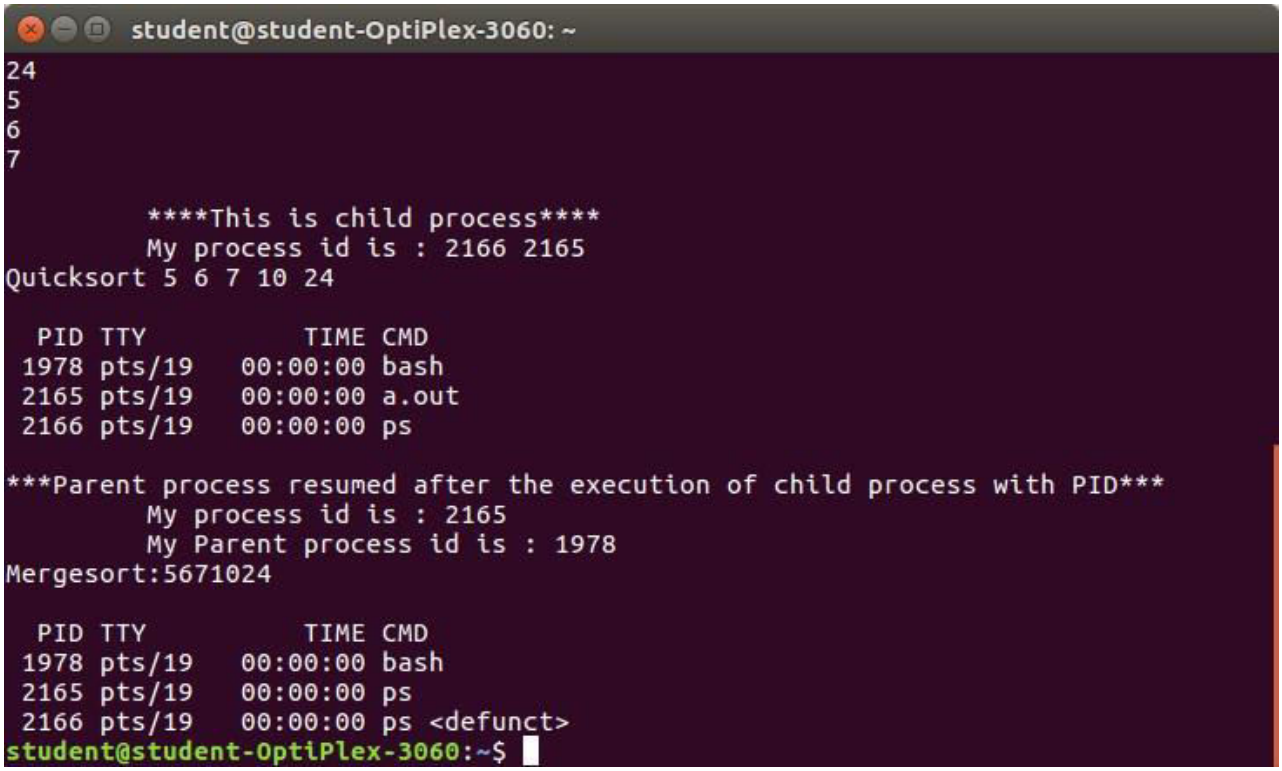
```
#include<stdio.h>
#include<unistd.h>
#include<sys/types.h>
void quickSort(int [],int ,int );
int partition(int [],int ,int );
void mergeSort(int [],int ,int );
void merge(int [],int ,int ,int );
int main()
{
int i,j,n;
pid_t pid;
int arr[30];
printf("\nEnter the number of elements:");
scanf("%d",&n);
for(i=0;i<n;i++)
{
scanf("%d",&arr[i]);
}
pid=fork();
if(pid<0)
{
printf("Error occured:");
}
else if(pid==0)
{
printf("\n\t ****This is child process**** ");
printf("\n\t My process id is : %d %d", getpid(),getppid());
quickSort(arr,0,n-1);
printf("\nQuicksort");
for(i=0;i<n;i++)
printf(" %d",arr[i]);
printf("\n\n");
}
else
{
//wait();
sleep(3);
printf("\n***Parent process resumed after the execution of child process with PID***");
printf("\n\t My process id is : %d", getpid());
printf("\n\t My Parent process id is : %d", getppid());
mergeSort(arr,0,n-1);
printf("\nMergesort:");
for(i=0;i<n;i++)
printf("%d",arr[i]);
printf("\n\n");
```

```
}
execl("/bin/ps","ps",NULL);
return 0;
}
void quickSort(int arr[],int low,int high)
{
```

```
int j;
if(low<high)
{
j=partition(arr,low,high);
quickSort(arr,low,j-1);
quickSort(arr,j+1,high);
}
}
int partition(int arr[],int low,int high)
{
int i,j,temp,pivot;
pivot=arr[low];
i=low;
j=high+1;
do
{
do
i++;
while(arr[i]<pivot && i<=high);
do
j--;
while(arr[j]>pivot);
if(i<j)
{
temp=arr[i];
arr[i]=arr[j];
arr[j]=temp;
}
}
while(i<j);
arr[low]=arr[j];
arr[j]=pivot;
return(j);
}
void mergeSort(int arr[],int low,int high)
{
int mid;
if(low<high)
{
mid=(low+high)/2;
mergeSort(arr,low,mid);
mergeSort(arr,mid+1,high);
merge(arr,low,mid,mid+1,high);
}
}
void merge(int arr[],int i1,int j1,int i2,int j2)
{
int  temp[50];
int  i,j,k;i=i1;
j=i2;
k=0;
while(i<=j1 && j<=j2)
```

```
{
if(arr[i]<arr[j])
temp[k++]=arr[i++];
else
temp[k++]=arr[j++];
}
while(i<=j1)
temp[k++]=arr[i++];
while(j<=j2)
temp[k++]=arr[j++];
for(i=i1,j=0;i<=j2;i++,j++)
arr[i]=temp[j];
}
```




student@student-OptiPlex-3060: ~
24
5
6
7
****This is child process****
My process id is : 2166 2165
Quicksort 5 6 7 10 24
PID TTY TIME CMD
1978 pts/19 00:00:00 bash
2165 pts/19 00:00:00 a.out
2166 pts/19 00:00:00 ps
Parent process resumed after the execution of child process with PID
My process id is : 2165
My Parent process id is : 1978
Mergesort:5671024
PID TTY TIME CMD
1978 pts/19 00:00:00 bash
2165 pts/19 00:00:00 ps
2166 pts/19 00:00:00 ps <defunct>
student@student-OptiPlex-3060:~$