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Rapport de Projet Système d'exploitation

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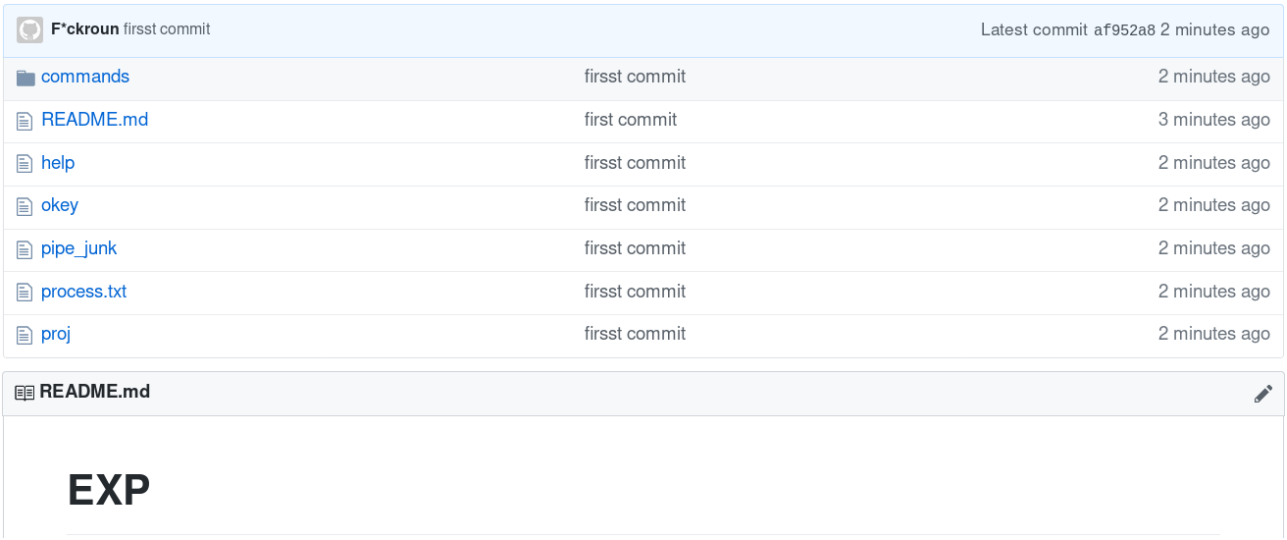
Partie I : Interpréteur de commande UNIX simplifié

Lien Github : https://github.com/WTFast69/EXP.git



Exemple d'execution :

pwd2 :

```
root@fuckroun:/root/Documents/exp/exp>>pwd2
/root/Documents/exp/exp
```

ls2 :

```
root@fuckroun:/root/Documents/exp/exp>>ls2
 okey  ll  .  .idea  ..  proj  process.txt  commands  pipe_junk  .git
```

touch2 :

```
root@fuckroun:/root/Documents/exp/exp>>ls2
 okey  .  .idea  ..  proj  process.txt  commands  pipe_junk  .git
root@fuckroun:/root/Documents/exp/exp>>touch2 lol

root@fuckroun:/root/Documents/exp/exp>>ls2
 okey  .  lol  .idea  ..  proj  process.txt  commands  pipe_junk  .git
```

mkdir2 :

```
root@fuckroun:/root/Documents/exp/exp>>ls2
 okey   .   .idea   ..   proj   process.txt   commands   pipe_junk   .git
root@fuckroun:/root/Documents/exp/exp>>mkdir2 lol
root@fuckroun:/root/Documents/exp/exp>>ls2
 okey   .   lol   .idea   ..   proj   process.txt   commands   pipe_junk   .git
```

cat2 :

```
root@fuckroun:/root/Documents/exp/exp>>cat2 process.txt
6, 2, 5
4, 3, 3
5, 3, 19
1, 6, 1
3, 7, 2
2, 8, 1
```

exit :

```
root@fuckroun:~/Documents/exp/exp# ./proj
Choose an option :
1 - Shell Command Line :
2 - Process Scheduler :
->>1
root@fuckroun:/root/Documents/exp/exp>>exit
Choose an option :
1 - Shell Command Line :
2 - Process Scheduler :
->>
```

HELP :

```
root@fuckroun:/root/Documents/exp/exp>>HELP


********** HELP MANUAL ************

cd2 : change current directory
alias : make an alias for a command
pwd2 : print the current directory's path
ls2 : list files and directories
cat2 : Display a file's content
rm2 : remove files or directories
mkdir2 : make a directory
touch2 : create a file
echo2 : print variable content
exit : exit command line
HELP : Show this manual

***********************************
```

alias :

```
root@fuckroun:/root/Documents/exp/exp>>alias kat=cat2
root@fuckroun:/root/Documents/exp/exp>>kat process.txt
6, 2, 5
4, 3, 3
5, 3, 19
1, 6, 1
3, 7, 2
2, 8, 1
```

echo2 :

```
root@fuckroun:/root/Documents/exp/exp>>echo2 qsdqsd
qsdqsd
```

cd2 :

```
root@fuckroun:/root/Documents/exp/exp>>cd2 SS
root@fuckroun:/root/Documents/exp/exp/SS>>cd2 ../..
```

Redirection entrée / sortie :

(>)

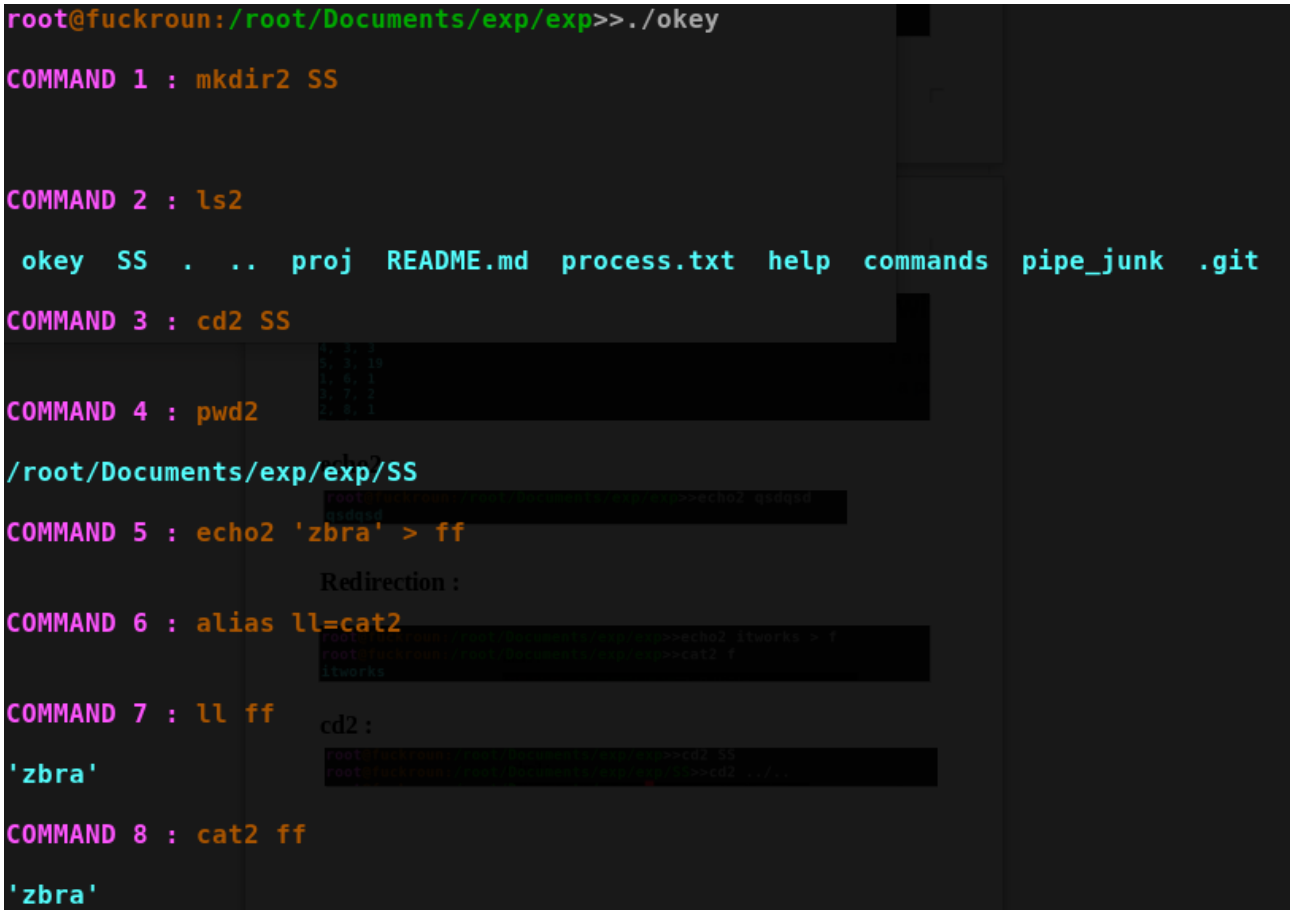
```
root@fuckroun:/root/Documents/exp/exp>>echo2 itworks > f
root@fuckroun:/root/Documents/exp/exp>>cat2 f
itworks
```

(<)

```
root@fuckroun:/root/Documents/exp/exp>>cat2 < process.txt
6, 2, 5
4, 3, 3
5, 3, 19
1, 6, 1
3, 7, 2
2, 8, 1
7 ,0 ,1
```

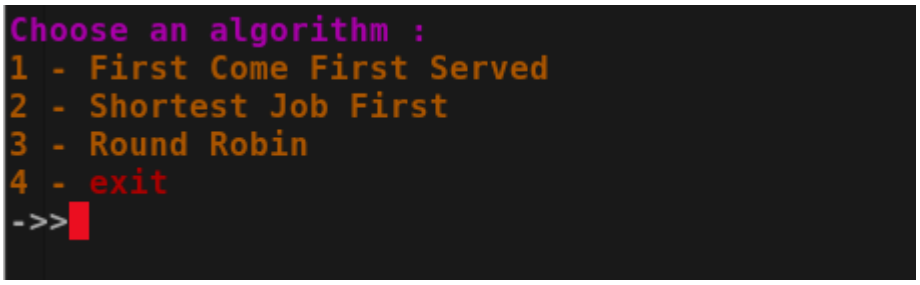
Pipe :(|)

Execution à partir d’un fichier :



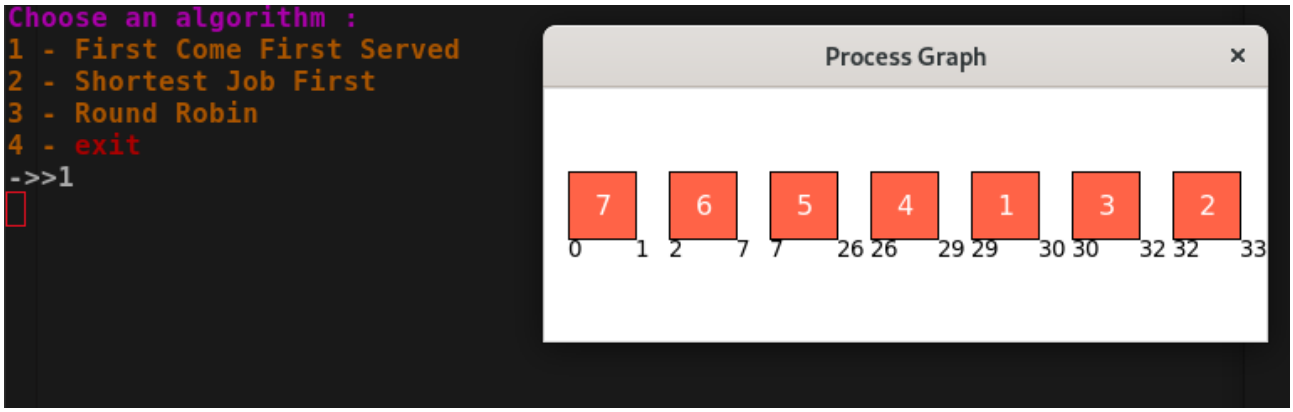
Partie II : Simulateur d’ordonnancement

Menu de l’ordonnanceur :

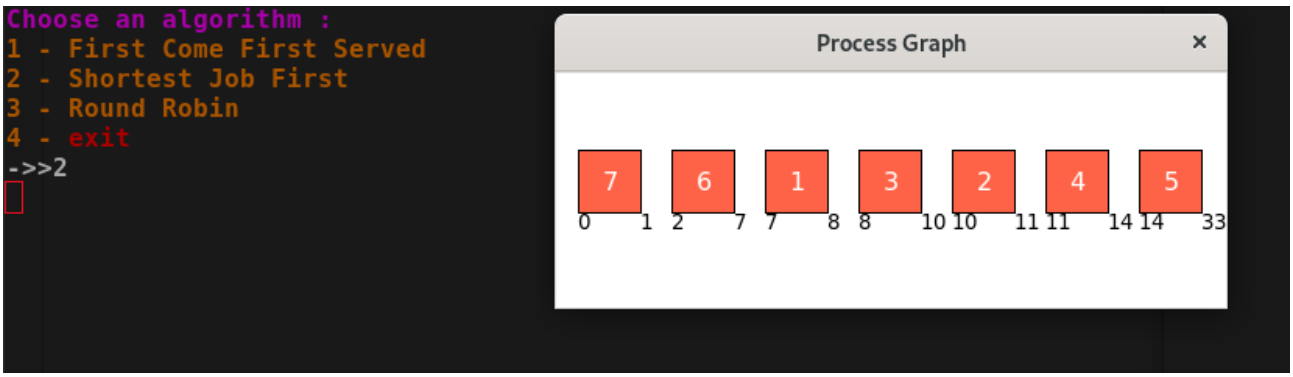


Exemple d’execution :

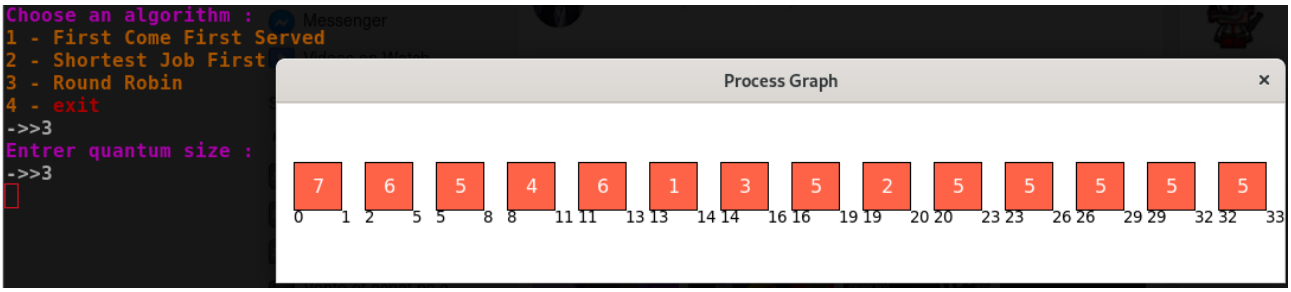
FIFO :



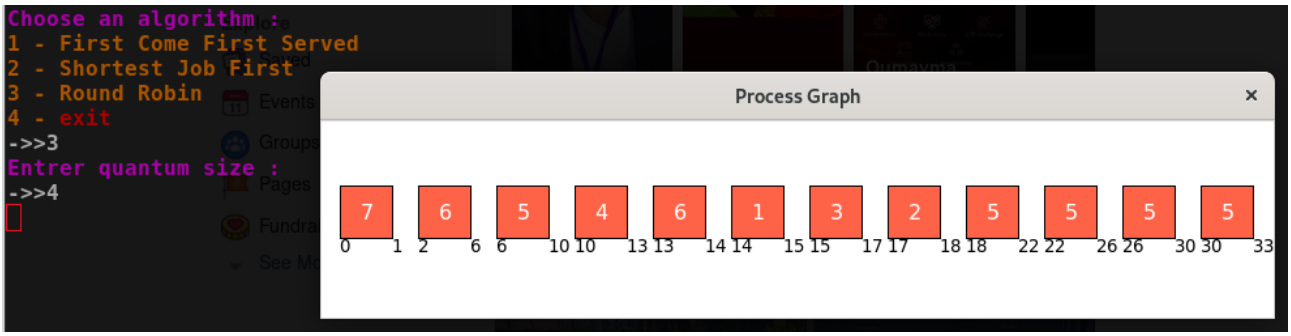
SJF :



Tourniquet : (quantum = 3)



Tourniquet : (quantum = 4)



ANNEXE I :

La fonction push() sépare les arguments de la commande et les enregistre dans un tableau.

```
start = Popen(args='commands/pwd2',stdout=PIPE,stderr=DEVNULL,encoding="utf-8").communicate()[0][:-1]

def push(data,command,Default=None):
    temp=["%s/commands/%s"%(start,command),]
    if not Default:
        for k in data.split(" ")[1:]:
            temp.append(k.replace(" ",""))
    return temp
```

La fonction call() execute les commandes en c et recupère leurs résultats.

```
def call(co,command,ret=None,Default=None):
    try:
        Default=open(Default,"r") if Default else None
        out=Popen(args=push(co,command,Default),stdout=PIPE,stderr=DEVNULL,stdin=Default,encoding="utf-8").communicate()[0][:-1]
        if not ret:
            print(colors.lightcyan+colors.bold+out+colors.reset)
        else :
            return(out)
    except:
        print(colors.lightred+colors.bold+"An Error Occured !"+colors.reset)
```

La fonction execute() sépare les commandes passées en une seule ligne et gére la redirection de l’entrée et sortie.

```
def execute(co,ret=None,Default=None):
    command=None
    eq=co.find("=")
    sp=co.find(" ")
    if "|" not in co:
        for j in aliases.keys():
            if j in co :
                command= (co[:len(co) if sp == -1 else sp] if eq == -1 else co[eq+1:]).strip().lower()
                co.replace(command,aliases[j])
                command =aliases[j]
                break
    if not command:
        command= (co[:len(co) if sp == -1 else sp] if eq == -1 else co[eq+1:]).strip().lower()
    for i in cmd :
        if '|' in co:
            try:
                out=None
                splt=co.split("|")
                for i in splt:
                    i.strip()
                    out=execute(i,True,"pipe_junk" if out else None)
                    if out:
                        with open("pipe_junk",'w') as f:
                            f.write(out)
                if out:
                    print(colors.lightcyan+colors.bold+out+colors.reset)
            except:
                print(colors.lightred+colors.bold+"An Error Occured !"+colors.reset)
            finally:
                break
        elif '>' in co:
            try:
                splt=co.split(">")
                with open(splt[1].replace(" ",""),'w') as f:
                    f.write(execute(splt[0].strip(),True)+"\n")
            except:
                print(colors.lightred+colors.bold+"An Error Occured !"+colors.reset)
            finally:
                break
        elif '<' in co:
            try:
                splt=co.split("<")
                execute(splt[0],None,splt[1].replace(" ",""))
            except:
                print(colors.lightred+colors.bold+"An Error Occured !"+colors.reset)
            finally:
                break
        elif i == command:
            if 'alias' in co:
                z = co.replace(" ","").split("=")
                aliases[z[0].replace("alias","")] = command
            elif 'help' == command:
                print("help not implemented")
            elif 'exit' == command:
                return 'exit'
            else:
                if 'cd2' == command:
                    try:
                        exec(call(co,command,True,None))
                    except:
                        print(colors.lightred+'No Such Directory : '+colors.yellow+colors.underline+co.replace(command,"").strip()+colors.reset)
                else:
                    return call(co,command,ret,Default)
            break
    else :
        print(colors.lightred+'Command '+colors.yellow+colors.underline+command+colors.reset+colors.lightred+' Not Found !! Check out ' +colors.BrightYellow+'HELP'+colors.lightred+' command'+colors.reset)
```

La fonction Shell() interprete les commandes et l’execution de plusieurs commandes d’un fichier texte.

```python
def shell():
    while 1 :
        pwd = Popen(args='%s/commands/pwd2'%start,stdout=PIPE,stderr=DEVNULL,encoding="utf-8").communicate()[0]
        machine = Popen(args=['uname -n'],shell=True,stdout=PIPE,stderr=DEVNULL,encoding="utf-8").communicate()[0][:-1]
        x = (colors.bold+colors.pink+os.environ['LOGNAME']+colors.BrightYellow+'@'+machine+':'+colors.BrightGreen+pwd+colors.lightgrey+'>>'+colors.BrightWhite).replace('\n', '')
        s = input(x).strip()
        if s == "":
            pass
        elif re.search("^./[a-zA-Z0-9]*$",s):
            s = s[2:]
            try:
                with open(s,'r') as f:
                    data=f.readline()[:-1].split(";")[:-1]
                    count = 0
                    while data:
                        for co in data:
                            count += 1
                            co=co.strip()
                            print(colors.pink+'\nCOMMAND '+str(count)+' : '+colors.BrightYellow+co+colors.reset+'\n')
                            execute(co)
                        data=f.readline()[:-1].split(";")[:-1]
            except:
                print(colors.lightred+'No Such File : '+colors.yellow+colors.underline+s+colors.reset)
        elif execute(s)=='exit':
            break
```

Les fonctions developpées en C :

Cat2.c :

```c
#include<stdio.h>
#include<unistd.h>
#include<stdlib.h>
#include<fcntl.h>

int main(int argc,char *argv[])
{
    int fd, i, ch;
char* filename;
    if (argc==1){
scanf("%m[^¤]s", &filename);
printf("%s",filename);
/*fgets(filename, 1000000000, stdin);
printf("%s",filename);*/
}
else{
    for (i = 1; i < argc; i++) {
        fd = open(argv[i],O_RDONLY);

        if(fd < 0)
           printf("No such file %s\n",argv[i]);
        else{

        while(read(fd,&ch,1))

            write(STDOUT_FILENO,&ch,1);

        close(fd);
    }}
}
 }
```

ls2.c :

```c
#include <sys/types.h>
#include <sys/stat.h>
#include <unistd.h>
#include <stdio.h>
#include <stdlib.h>
#include <dirent.h>

int main(int argc, char* argv[])
{
    DIR *mydir;
    struct dirent *myfile;
    struct stat mystat;
    if (argc < 2)argv[1]=".";
    mydir = opendir(argv[1]);
    while((myfile = readdir(mydir)) != NULL)
    {
        stat(myfile->d_name, &mystat);
        printf(" %s ", myfile->d_name);
    }
    printf("\n");
    closedir(mydir);
}
```

mkdir2.c :

```c
#include <stdio.h>

int main(int argc,char* argv[])
{
    int status;
    for(int i=1;i<argc;++i)
    {status= mkdir(argv[i]);
    if (status)
    printf("Unable to create directory %s\n",argv[i]);
    } }
```

pwd2.c :

```c
#include <unistd.h>
#include <stdio.h>

int main() {
    char cwd[1024];
    chdir("/path/to/change/directory/to");
    getcwd(cwd, sizeof(cwd));
    printf("%s\n", cwd);
}
```

rm2.c :

```
#include<stdio.h>

void main(int argc, char* argv[]){
int status;
for (int i=1;i<argc;i++){
status=remove(argv[i]);
if(status)
    printf("Failed to delete %s\n",argv[i]);
}}
```

touch2 :

```
#include <stdio.h>
int main(int argc,char* argv[])
{
FILE *fp;
for(int i=1;i<argc;i++){
if(fopen(argv[i], "r"))
{printf("File already exists %s\n" ,argv[i]);
}
else
fp  = fopen(argv[i], "w");
}}
```

ANNEXE II :

La fonction selectionSort() permet de trier un tableau de processus selon un critère spécifié (date d'arrivée , temps d'execution)

```
def selectionSort(alist,s):
    for i in range(len(alist)):
        minPosition = i
        for j in range(i+1, len(alist)):
            if alist[minPosition][s] > alist[j][s]:
                minPosition = j
        temp = alist[i]
        alist[i] = alist[minPosition]
        alist[minPosition] = temp
    return alist
```

La fonction scheduler() permet de planifier les processus selon l'option choisie (FIFO, SJF, Tourniquet).

```
def scheduler():
    inpt=input(colors.BrightMagenta+"Choose an algorithm :\n"+colors.BrightYellow+"1 - First Come First Served\n2 - Shortest Job First\n3 - Round Robin\n"+"4 - "+colors.BrightRed+"exit\n"+colors.BrightWhite+"->>")
    if inpt == "1":
        graph(data)
    elif inpt =="2":
        def get_sj(alist,index):
            temp=[alist[0],]
            for i in alist[1:]:
                if i[1] <= index:
                    temp.append(i)
                else:
                    break
            return selectionSort(temp,2)[0]
        index=data[0][1]
        temp=[]
        alist=data
        while len(alist) > 0 :
            k=get_sj(alist,index)
            temp.append(k)
            index+=k[2]
            alist.remove(k)
        graph(temp)
    elif inpt == "3":
        quantum=""
        while not quantum.isdigit():
            quantum=input(colors.BrightMagenta+"Entrer quantum size :\n"+colors.BrightWhite+"->>")
        quantum=int(quantum)
        save=data
        index = data[0][1]
        def get(alist,index):
            temp=[alist[0],]
            for i in alist[1:]:
                if i[1] <= index:
                    temp.append(i)
                else:
                    break
            return temp
        temp = get(save,index)
        ol=[]
        while len(save) > 0:
            print(temp)
            for i in temp:
                sub=min(quantum,i[2])
                ol.append((i[0],i[1],sub))
                i[2] -=sub
                index+=sub
                i[1]=index
                if i[2]<1:
                    save.remove(i)
            if save:
                index=max(index,save[0][1])
                temp = selectionSort(get(save,index),1)
        print("last",ol)
        graph(ol)
    elif inpt == "4":
        return
    else:
        print(colors.bold+colors.BrightYellow+"Wanna try again ?"+colors.reset)
    scheduler()
```

La fonction graph() permet de gérer l'interface graphique.

```
def graph(data):
    root = tk.Tk()
    root.title("Process Graph")
    c_width = len(data)*60+10
    c_height = 150
    c = tk.Canvas(root, width=c_width, height=c_height, bg='white')
    c.pack()
    x_stretch = 20
    x_width = 40
    x_gap = 15
    count=0
    for x,y in enumerate(data):
        x0 = x * x_stretch + x * x_width + x_gap
        x1 = x * x_stretch + x * x_width + x_width + x_gap
        s=max(count,y[1])
        c.create_rectangle(x0, 50, x1,90, fill="tomato",activefill="blue")
        c.create_text(x0 + 16, 80, anchor=tk.SW, text=y[0],activefill="black",fill="white",font="1")
        c.create_text(x0 , 105, anchor=tk.SW, text=str(s))
        count=s+y[2]
        c.create_text(x1, 105, anchor=tk.SW, text=str(count))
    root.mainloop()
```