Assingment-3
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Solution: 1-(a)

```
monitor RW_Controller

{
        int nr = 0, nw = 0;

        cond oktoread,
        cond oktowrite;
        procedure request_read()
        {
                nr +=1;
                while (nw > 0) wait(oktoread);
        }
        procedure release_read()
        {
                nr -=1;
                if (nr == 0) signal(oktowrite);
        }
        procedure request_write()
        {
                While (nr > 0 || nw > 0) wait(oktowrite);
                nw += 1;
        }
        procedure release_write()
        {
                nw -=1;
                signal(oktowrite);
                while (nr!=0)
                {
                        signal(oktoread);
                        nr--;
                }
        }
}
```

Solution: 1-(b)

```
monitor RW_Controller
 {
        int nr = 0, nw = 0, que=0;
        cond oktoread,
        cond oktowrite;
        procedure request_read()
        {
                while (nw > 0) wait(oktoread);
                nr += 1;
```

```
}
procedure release_read()
{
        nr -=1;
if (que >0 && nr == 0) signal(oktowrite);
}
procedure request_write()
{
        while (nr > 0 || nw > 0)
        {
                que +=1;
                wait(oktowrite);
        }
nw = nw + 1;
}
procedure release_write()
{
        nw -=1;
        if (wquene>0) signal(oktowrite);
        else signal(oktoread);
}
```

Solution: 1-(b)

```
monitor RW_Controller
{
        int nr = 0, nw = 0, wq=0, rq=0;
        cond oktoread;
        cond oktowrite;
        procedure request_read()
        {
                while (nw > 0|| nr>0)
                {
                        rq +=1;
                        wait(oktoread);
                }
        nr += 1;
        }
        procedure release_read()
         {
                nr -=1;
                if (wq>0) signal(oktowrite);
                (oktoread);
        }
        procedure request_write() {
        while (nr > 0 || nw > 0) {
        wq +=1;
        wait(oktowrite);
        }
        nw += 1;
```

```
}
procedure release_write() {
        nw -=1;
        if (rquene>0) signal(oktoread);
        else signal(oktowrite);
        }
```
Solution: 2
```
monitor Printer_Controller
{
        int A = 0, B = 0, q1=0, q2=0;
        int t= 1 or 2 or 3;
        cond oktouseA, oktouseB;
        procedure request_printerA{
                while (A > 0)
                {
                        if (t=1)
                        {
                                q1 +=1;
                        }
                        else if (t = 3)
                        {
                                if (q1>q2)
                        {
                                q2 += 1;
                        }
                        else q1 +=1;
                }
                wait(oktouseA);
        }
        A  += 1;
}
procedure release_printerA{
        A –= 1;
        if (q1>0) {
        signal (oktouseA);
}
}
procedure request_printerB {
while (B > 0)
 {
        if (t=2) {
        q2 +=1;
}
        else if (t = 3) {
                if (q1>q1){
                q1 += 1;}
        else
                q1 = q2+1;
```

```
}
        wait(oktouseB);}
B += 1;
}
procedure release_printerB {
B –= 1;
If (q2>0) {
signal (oktouseB);
}
}
```