```
write a c programs to simulate the following
CPU scheduling algorithms
a) FCFS
#include <stdio.h>
Struct process
      int process No, at, bt, ct, tat, wt;
3;
Void readProcess (struct process re], int n)
      int i:
      for(i=0; i<n; i++)
        " IT STATE IT BESIDES KONTERED STATE STATE
             printf ("Enter process Number: ");
             Scanf (" 1.d", & & [i] process No);
             printf ("Enter Assival time:");
             Scanf ("1.d", & 8[i] at);
             printf ("Enter Burst time:");
             scanf ("1.d", do[i].bt);
             · Deily of 18
            Sprant [-1]
```

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2
void Time (struct process V[], int n)
1
      int 1;
      for (i=o;i<n;i+t)
             if (i = = 0 11 8[i].at > 8[i-i].ct)
                    8[i].ct =8[i].at+8[i].bt;
             x[i].ct = x[i-i].ct + x[i].bt;
             vij.tat = vij.ct - vij.at;
             V[i]. wt = v[i].tat - v[i].bt;
      3
     SoutProcess (struct process VIJ, int n)
1
      struct process temp;
      for (i=0; i<n; i++)
            for (j=φ;j<n-i;j++)
                 if (8[1].at < 8[1-1].at)
                          temp = o[i];
                          v[i] = v[j-i];
                           o[j-] = temp;
```

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2

```
Void
                               print Process (struct process of I, int n)
 1
                                   int is
                                    printf ("Process No. It at It bt It ct It tat Itwt In");
                                   for (i=0; i<n; i++)
                                                                                                                                                                             1 - with front body
                                                                       printf (" 1/d |t 1/d |t
                                                                                                                     v[i].processNo, v[i].at, v[i].bt, v[i].ct,
                                                                                                                             v[j.tat, v[j.wt);
                                     3
                                                                                                                                                                        Extendition time . 4
                                                                                                                                                                                 o : smit town reserve
int main()
                                                                                                                                                             stated a Associated Alfred To S
                                  Struct process p[30];
                                                                                                                                                                          The south the south
                                  int n:
                                  printf ("Enter number of processes:");
                                   Scanf ("1.d" An);
                                   read Process (p,n);
                                    Sort Process (p,n);
                                    Time (p,n);
                                      print Process (p,n);
```

## (4)

## INPUT:

Enter number of processes: 4

Enter process Number: 1

Enter Arrival time: 2

Enter Burst time: 1

Enter process Number: 2

Enter Arrival time: 0

Enter Burst time: 2

Enter process Number: 3

Enter Assival time: 4

Enter Burst time: 2

Enter process Number: 4

Enter Arrival time: 5

Enter Burst time: 1

## OUTPUT:

| Process No. | at | bt | ct | tat | wt |
|-------------|----|----|----|-----|----|
| 2 /         | 0  | 2  | 2  | 2   | 0  |
| · V         | 2  | 1  | 3  | 1   | 0  |
| 3           | 4  | 2  | 6  | 2   | 0  |
| Ч           | 5  | 1  | 7  | 2   | 1  |

Moral process - plants

i (" : Bassanory to redwin satura ) I twing

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Walt to Dure to Bly 11 Deal 11
 #include <stdions
 struct process 10-11
 {
         int processNo, at, bt, ct, tat, wt;
 3;
 void readProcess (struct process re[], int n)
        (or Jrvi . E le samong town) - small town
        for(i=0;i<n;i++)
        s Timos, or savida, lad, or when july the
                printf ("Enter process Number: ");
                Scanf ("1.d", & & [1] · process No);
                 printf ("Enter Arrival time:");
                 Scanf ("1,d" $ 8[1].at);
                 printf ("Enter Busst time:");
         ( +0. ( Scanf ( "1.d", & &[i]. bt);
           : [1] a = guest-
void Time (struct process &[], intn)
         : 9000 F= [1-116
1
        int i;
       for(i=0; i<n; i++)
```

```
if (i == 0 11 8[i] at > 8[i-i] ct)
                     ε[i]·ct = ε[i]·at + ε[i]·bt;
              else
                    σ[i].ct = σ[i-i].ct + σ[i].bt;
              v[i]·tat = v[i]·ct - v[i]·at;
               817. wt =817. tat -817. bt;
      3
Void
     SostProcess (struct process of], int n)
1
      int i, j, min = 0, k=1, btime = 0, count=1;
    Struct process temp;
      -fox (i=0; i<n; i++)
      points (" Enter Honival Eine : ") ]}
            for (j=i;j<n-i;j++)
        : (" : Swit fewar ostor") Throng
             if (vij) at < v[j-] at)
                             temp = v[i];
               (ir fini. ET = 2 8 [i] = 8 [i-1]; and blow
                              8[j-1] = temp;
                    if (8[i].at = = 8[i-i].at)
```

6

6

```
if (&Ci].bt < &Cj-1].bt)
          16410 - grade
                                    temp=&[i];
                                    8[i] = 8[i-1];
          I'd WIF = 1, 19
                                     o[j-]=tempi
              3
    if (i == 0)
tot 1/ to 1/ 10 1/ btime = x [0] at + x [0] bt;
           else
               blime = blime + o[i].bt;
          min = 8 (kg. 5t;
 # 154 $1 (count = k; $1 $1 15 4") 1 John
while (& [count] at <= btime of count <n)
    1 10. ET - 10. EUG. 10. EUG
         3 count ++;
        for (j=k; j < count; j++)
               if (btime >= &[i] at && &[i].bt<min)
```

```
LANGE STATES A
                             temp = &[K]'s
                              8[K] = 8[i];
                              & CO = temp:
                              min = o[K].bts
                     3
             K++ :
3
     print Process (struct process &[], int n)
Void
        int i;
         printf (" Process No. It at It bt It ct It wit It tat");
        for (i=0; i<n; i+t)
                            ; 50. BI) 8= Miny
                 pointf ("1.d It It .lid It 1.d It 1.d It
             . Alt. 1.d In", & UJ. process No,
                        vij.at, vij.bt, vij.ct,
                          voll. tat, voll. wt;
                   (tri: Imasi: 1-1) rol
3 more to Dila an de Mis = comité ) ??
```

```
Enter process number: 5
int main ()
                            Enter Aprival time: 10
        struct process p [30]: E : smit teams outra
         int n;
         printf ("Enter Number of processes: ") ; makes
         Scanf (47, d", &n); to to 04 2290009
         read Process (p,n);
          soft Process (p, m);
          Time (pin);
                                            3
                                01
          point Process (p, n);
3
          28 22 10
Input:
Enter number of processes: 5
Enter process number: 1
Enter Arroival time: 1
Enter Burst time: 5
Enter process number: 2
Enter Arrival time: 1
Enter Burst time: 5
Enter process number: 3
```

Enter process Number: 4 Enter Arrival time: 8 Enter Burst time: 2

Enter Arrival time: 6

Enter Burst time: 12

```
Enter process number: 5
                                      ( ) riber Smi
Enter Arrival time: 10
Enter Burst time: 3 : [0] 9 2290000 fourts
                                    IN Jul
point (" Enter Number of processes: "It unto
                        ctil tat wt
                    bt
               at
process No.
                        (619) 5000 book
                      5
                        (Mg) 2210001 $50
                      5
     2
                           14 ((m.4) smpT
     53
              10
                        Soint Brocess (p. 11);
                      2
               8
      4
                                  22
                                      10
      3
                      12
                           28
               6
```

: JugarI

Enter number of processes: 5

Enter process number: 1

Enter Arvival time: 5

Enter process number: 2

Enter Arvival time: 5

Enter Burst time: 5

Enter process number: 5

Enter Burst time: 5

Enter process number: 5

Enter process number: 5

Enter process number: 1

Enter process number: 1

Enter process number: 1

Enter process number: 1

Enter Aprival time: 8

Enter Burst Hime: 2

```
c) priority
# include estdio. hs. [1] == 1) 41
struct process
}
   : #d.[1] ct +0. [1-1] 8= 40. [1]8
         int process No, at, bt, ct, tat, wt, pty;
3;
            : 1d. [] 5 - 5at.[] 8= fw.[] 8
Void read Process (struct process rel, int n)
         void sort Process (struct process of I, inst vi) Ini
          for (i=0; i<n; i++)
         int is smin = 0, K=1, brime = 0, count = 1;
                    printf ("Enter process number ");
                    Scanf ("1.d", & & [i]. processNo);
                    printf (" Enter priority: ");
                    Scanf (" 1. d", & & [i] pty);
           ( +0. [ - ] printf ("Enter; Arrival time: ");
                     Scanf ("1.d", 48[i].at);
               :[i] = printf (" Enter Burst time :");
              : [-i] & scanf (",d", 40[].bt);
           3 : gmst 11-178
            1f (8[1] at = = 8[1-1].at)
  void Time (struct process &[], int n)
         Jewis Just
         for(i=0; i<n; i++)
```

```
if (i == 0 11 v[i] at > v[i-i] ct)
                             8[i].ct = 8[i].at +8[i].bt.
                    else
                             8[i].ct = 8[i-i].ct +8[i].bt;
          > (1) - tat = > (1) - ct - > (1) - at :
                                                           - 8
                    v[i]. wt =v[i]. tat -v[i]. bt;
         3
              (or string toward (strangt bior bior
3
Void Sort Process (struct process VIJ, int n) fri
1
                              (++1; m>1; 0=1) roll
        int i, j, min = 0, K=1, btime=0, count=1;
    struct process temp; ) Hring for (i=0; i<n; i++)
            for (j=1); j 2m=1; j++)
             Scanf (" 1. d", & & [] PM);
      : (": smit lavison if ( veij at z'v [j-J. at)
              Scanf (44. d" $10 [1] at);
      : (" Enter Boxet time: ");
               : (L.170 L. "b. "b") 8 (3) = 8 (1-0);
                                 8[j-i] = temp;
                (r tri, [] o if (x[]]. pty < 8[j-]]. pty
                                      temp=&[i];
                             (12) | 8[1-] = temp;
```

```
Void print Powers (struct process of 16 int 1)
     for (1=0; i <n; i++)
privit? ("Process No. 12 private at 12 bt 14
          btime = s[o].at + s[o].bt;
             else btime = btime + & [i]. bt;
             min = o [k]. pty;
b.1. 7/ PV + count = K3/7/ PV ") Harisa
    " m/ 6 while ( & [count] at <= btime && count <n)
 ++ Friesoccessio, our pty,
2 [1] . at , 2 [7. bt , 2 [] . Ct)
(tw. [ ; for (i=k i; i < count; i++)
                   if (btime > = o[j].at && o[j].pty
                                          (min)
                                         ( ) Wipm Jri
                           temp = &[k];
                        Stouch of [1] 8= [x] 80]
                            r[i] = tempin Jal
    Pitty . [ ] of min ber of processes : );
                        Scanf (" 1.d", 4m);
      k++; ; (n, q) 200000 60000
                         scot Pooce es (p, n);
```

```
void print Process (struct process of [], int n)
2
                              (++1:10); 0=1) 00+
        int i;
        printf ("Process No. 1t priority. It at It bt It
         : td. lojo + toct It tat It wt In");
        for (i=0; i < n; i++)
                           : Mid Ell o = Win
                printf (" xd ItIt xd ItIt xd It xd It xd It
 (" n) pr. 71 pr. 21 pr. 3) == prime & count < w)
                       · | v [i] : process No , v [i] · pty,
                           vij.at, vij.bt, vij.ct,
                 (this inwortije tat, viil. wt)
 if (bilime > = oli) at & oli] . pty
    (winy>
int main ()
1
              temp= s(K);
        Struct process p[30];
         int nimes - the
          point ("Enter number of processes:");
          Scanf (" 1.d", 4n);
          readprocess (p,n);
                                    K++ ;
          sort Process (P, n);
```

```
Time (pin);
                         Evilor Actival Africa; to
          point Process (Pin); promit down rooms
Input:
Enter number of processes: 5
Enter process number: 1
Enter priority: 2
Enter Assival time: 0
Enter Burst time: 2
Enter process number: 2
Enter priority: 1
Enter Arrival time: 1
Enter Burst time: 4
Enter process number: 3
Enter priority: 6
Enter Arrival time: 2
Enter Burst time: 8
Enter process number: 4
Enter projosity: 4
Enter Arrival time: 3
Enter Burst time: 2
Enter process number: 5
Enter proprity ! 3
```

| Enter Assiva | time: 4  | Time (p. vi);              |
|--------------|----------|----------------------------|
| Enter Burst  |          |                            |
| Enter Burost | , cine.  | 5                          |
| 10           |          | 2                          |
| OUTPUT:      |          | and the second second      |
| Process No.  | priority | at bt ct tat wt            |
| 1            | 2        | at bt ct tat wt            |
|              |          | Enter process number:      |
| 2            | 1/       | Enter priority: 2          |
| 5            | 3        | Enter of Solva time: 0.8 4 |
| 4            | ч        | 3 2 1 War 8 8 8 60 50 mg   |
| /6           |          |                            |
| 13           | 6        | 2 8 19 17 9 menters        |
|              |          | Enter priority: 1          |
|              |          | Enter Appival time: 1      |
|              |          |                            |
| 12020        |          | Enter Burst - time: 4      |
| 1/2          |          | Enter process number: 3    |
|              |          |                            |
|              |          | Enter priemity: 6          |
|              |          | Enter Arrival time: 2      |
|              |          | Enter Burst time: 8        |
|              |          |                            |
|              |          | inter process numbers 4    |
|              |          | enter policity: 4          |
|              |          | nter Arrival time: 3 -     |
|              |          | viter runst time: 2        |
|              |          | TOUR SOUR STIM             |
|              |          | where process ryumbers; 5  |

```
d) Round Robin
                                            ( ) Jook biov
#include <stdio.h>
                             (++1: 1-112) (0=3) (0)
struct pres
       int no, at, bt, ct, tat, wt, tbt;
3 p [10], m2[30], timp to [229) 71
int i, n, j, k = 1, to, cnt, pt, m = 1;
void read Bes (3) = [1] 9
 3
             P[i-1] = timp;
         point ("Enter time quantum: ");
       (Iscanf ( 72d", Ltq)) 41
          for (i=0; i<n; i++)
    if (P[1]. bt <P[3-1]. bt)
                   p[i].no= i+1;
        : [i] 9 = grapoint ("P.1.d - Arrival time:", i+1);
       : [1-1]9 = [1] Seanf ("",d", & P[i].at);
       ignit = li-il pointf (" P-1-d - Busst time: ", i+1);
                   Scanf ("-1,d", & B[i]. bt);
                   P[i]. tbt = P[i].bt;
          cant =n;
                                         2 [0] 9 = [0] pm
```

```
void sort()
3
                                  It include astdio ho
      for (=0; i<n-1; 1++)
                                         stanct pacs
             for (j=1; j<n-i; j+t)

(++i; i-n-i; j+t)

int no at , bt , ct , tat , we then;
                     if (PC; ].at & PC; -i].at)
                  PGJ=PG=BAbox blow
                              P[j-] = tmp;
             point ("Enter time guantum: ");
                      if (PUJ-at == P[j-j-at)
                         (++1:10):0=1) rot
                             if (PCj].bt <P[j-J.bt)
                      : 1+i Lon-[i]q
   i (if) = qmtirte ("P".d - Arrival Lime:", iti);
               : (I-179 = [139 and ( " ) & P[1] = P[1] at);
     : ( +i , " : omit time : ", it ) :
              Scart ("6, 6") & G[13. bt) ;
              2 : td. [] q = td. [] q
                                      in= tota
    ma[0] = P[0];
```

```
biov
       calclime() (0< tdf-10) pm) 11
3
        1=0, j=0 [1] 2m = [m] gm
        while (cnt >0) it have
         1
                 if (m2 [i] . tbt < t2) 93/9
                          mg[i] that -= to;
                  (0==1) if; ct = pt;
                   : Eij pm = Elpt = m2[o] at + m2[i] . bt;
   Psilstat = pGJ.ct - PGJ.at;
   : td. [1] 9 - tat - [1] 9 = tw. [1] - tat - P[1] - tat - P[1] - bt;
                          : ++i
                   else
                           macij.tbt -= to
                           if (i==0)
                              Pt = m2 [6]. at + t2;
                            else
                                 pt+=to less tring biov
  (" M to tot while (K< m, & & PCW) at K= Pt)
                            m2[m] = p[k];
   point (" P++ 1.3d 1.3d 1.3d 1-4d 4.3d In
    printing to til bt. pillet, pillet,
            P (13. tat. 19 (40 - wet);
```

```
If (m2[1]. +6t >0) ( ) 3 mil > 10 5 blow
                     mq[m] = mq[i];
                     m++; (or two) slides
              3
             else
               (30 t > td). [1] pm) 71
          got - Jacot --
                malij.ct = pt;
td. [1] 2m + tn. Eojem = PGJ = m2 [i];
                     P[j] tat = p[j] ct - p[j] at;
; st. fild - tat - bild = bf + ms (1) - fot + to;
                      j++;
          14+; mp[i].tbt -= tg;
               (0==1) 4;
3
        1 + + D. [0] onr = +9
void printPrcs ()+=++9
       point ( parto at bt lict tat wt in);
       for (i=0;i<n;i++)
             printf ("p:/.d:/.3d 1.3d 1.3d 1.4d 1.3d In)
                    PliJino, PliJ. at, pliJ. bt, plij.ct,
                         p[i].tat,P[i].wt);
```

```
B. Assival time: 6
int main()
                           Pa - Burst - Lime : 3
     pointf ("Enter number of processes:");
      Scanf ("1.d", 4n);
      readPresential that to the ong
      sortc); s H a s
                                       SI
      calc Time() 3 31 18 8 2
                                       9
      printProcsCD6 88 F8 3
                                B H
                                 1 19
             9 30 29 20
                                  8 5
              5 32 27 22
                                      89
             33 30 23
                                  8
INPUT:
Enter number of processes: 6
 Enter Lime quantum: 3
PI-Arrival time = 5
 PI - Burst time : 5
 P2 - Arrival time: 4
P2 - Burst time: 6
 P3 - Avrival time: 3
 P3 - Burst time: 7
 P4 - Arosival time: 1
P4 - Burst time: 9
 Ps - Arrival time: 2
 Ps - Burst time: 2
```

P6-Arrival time: 6 int mains Po-Burst time: 3 point ("Enter number of processes ("); OUTPUT: Scornf (" 1. d", dri) ; wead Book tw tat bt ct at P.No 2 : () 500 4 6 2 P5 2 calc Three 12! 21 15 3 PG 6 point Poce (F) 23 6 27 P2 4 20 P4 9 29 30 22 27 32 5 PI 5 30 23 THPUT: 33 P3 7 3 Enter number of processes: 6 Enter - time quantum: 3 PI-Avoival Livne = 5 PI - Burst time : 5 PL - Avrival time: 4 Ps - Bunct time: 6 Ps - Avoival - Lime: 3 PS - Butst Livne: 7 Py - Addival time: 1 Py - Burst time: 9 13 - Nozival - Eine: 2 Ps Burst time: 2

```
write a c program to sti simulate Bankers
Algorithm for deadlock avoidance and Prevention.
         point ("Enter poccess "I'd max
#include / Kstdio-h>
struct process
                    (++) (m) ( o=1) 009
1
int process No, alloc [10], max [10], need [10];
   Scarf (" 1, d", do [i] mox [ii]);
int order [30];
void readProcess (struct process re3, int n, int m)
                            (++1; N>1:0=1)00-
3
    printf ("Enter allocation matrix: IN");
for (i=0; i<n; i++)
        - 3 [i] -alloc [i] :
              printf ("Enter process ",d allocations: In",
                               i (1+i)
             for (j=0;j<m;j++)
    int resource Reg (stouct process of I sintly, int m,
                      printf ("Enter alloc [-1,d]: ",j);
                       scanf (" 1.d", & & [i] alloc[i]);
printe ("Enter process number the reguest: it
                              Sean + ("1, d", &x);
       4
       printf (" Enter Max Matrix (In)); 0=1) 501
```

```
for (i=0; i<n; i++) + morporg 9 s ofice)
 Algorithm to a deadless avoidance and Premison
              point ("Enter process 1.d max
                          resources : (n's, i+ 1) ; lovi 11
                                        stauct process
              for (j=0; j<m; j++)
   ; (i, in: [b.1] xpm bather ) thing, max [10], need [10];
                      scanf (" 1.d", & & [i] . max [i]); : &
                                         int order Ball
    void readforcess (stouct process of 3, int mit m)
        point ("Enter allocation mater: : m"):
                       v[i].need[i] = v[i].maz[i]
                               - v[i] ·alloc[i];
point? ("Enter process T.d alloughions: In)
3
                       (+ti:m>i: 0=i) 801
int resource Reg(struct process of I, intin, int m,
 (C: ": (b.) sollo sint avail (3);
    Scarf ("1.d", & ofile allogin);
       printf("Enter process number for request:");
        Scanf ("1.d", &x);
        points (" Enter max max maxim; m's); 10=1) rot
```

```
if (reg [] < = r [n] need [] ld
                               req (i] = avail [i])
                  Plag=0is
         (++1: m>1:0=1) avail[i] - = 8e2[i];
                          8[x].alloc[i] += 8eq[i];
   if (803. need(13.6==
                         v[x]·need[i] -= veq[i];
     E COOKED &
  finish[i]==0
                  else
                        return 0;
    : ++ Bolda sernau 1;
  3
  int safe State (struct process &[3, int n, int m,
             (mint avgil[])
(+H): mosk [m], count =0, S=0,
    + (x) × 8000 b=1, flag %
  Fil solloctile
            for (i=0; i<m; i++)
        08des [5] = [ ]
                   work [:] = avail[i];
           finish[0] = 0;
        i + thile (b==1 && count < n)
             1=0
                      b=0:
```

```
1) 17 60 for (i=0; ixn sitt)
    seq $13 c = avail [i]
                           Plag=033
         :[i] 898 = -[i] 11infox(j=0;j<m;j++)
    : [7] est + [7] oollo. [2]
                                 if (x[i]. need[j]. ==
   5[x]. need[1] -= seg[1];
                                      work[i] dd
                                          finish[i]==0
                                 92/9
                   Seturon 0;
                                  : 1 router flag++;
   int; int int m, int m, int m, int m,
                           if (flag ==m)
(0=2,0= true), [m] > wook [m], work [m], count =0; k=0;
                             : Bolf : 1=9 mosk[k]+
                                          = v[ij.alloc[k]
                        (++1:m>1:0=1) xof
oxdex [s]=1;
                itts work [i] = avail[i];
                               : 0 = [o] dzirit
finish[i]=1;
                 (n> found 1==d) 9/in(0)++;
                                      b=13
                             3019
                           ; o=d
         3
```

```
o ocginentatio
```

```
if (count==m), see (P) sessioner= or
                    return 1;
                                          (1==8)97
              else
      point ("Resource can be allocated ");
   3
                g= satestate (p,n,m, avail);
   int maines
   1
       int n,m, avail [10], seg [10], i, v, 2;
: (" | sassanor to sabo and ) drives
            Printf (" Enter number of processes: ");
   (1) osboo scanf (17.d", 4n);
              printf (" Enter number of resource type: ");
               Scanf (4.1.d', km);
      (++i; m>i; 0=i) rot
printf(" system is in steadlock
           state ");
                        printf ("Enter number of resources
                                  of type 1.d:", it 1);
                         Scanf (4%, d' davail [:7);2/9
   pointf ("Resource commot be appointed in");
               read Process (P,n,m):
               printf ("Enter Request Matrix: In");
               for (i=0;i<m;i++)
                       printf ("Enter request [1.d]: ", i);
                       Scanf ("1.d", & reg[i]);
```

```
& = resource Req (p, req, n,m, avail);
                            : 1 would so
          if (8 = = 1)
                printf ("Resource can be allocated");
                2= SafeState (p,n,m, avail);
                 if (2 == 1)
                                         int mains
         printf ("The System is in safe
                         pointf ("The order of processes: In");
  (" : 202293000 to foo (int a=0; a < n; a++)
                                  printf ("1.d", order [a]);
point (" Enter number of refource type: );
                else
                            Scant ("1.4") from);
                           (+Fi; m>i; 0=i) rol
                       printf (" System is in deadlock
                                         state");
point ("Enter number of resources
    of type 1.d : "; if 1);
        Elserif ("b. d', d'avail [:] 9219
                pointf ("Resourace cannot be allocated In");
                       Bead Poocess (Pinim);
     pointf ("Enter Request Matrix: In");
                           (++1: M>1: 0=1) 507
   paint ("Enter sequest [ r.d] : ", 1) ;
                 Scant ("14", 4000 (1));
```

```
Enter process 5 allocations:
INPUT:
Enter number of processes: 50: [0] sollo sollo
Enter number of resource types: 3
                                   Enter allocial:
Enter number of resources of type 1:3
Enter number of resources of type 2:3
                                          Enter
Enter number of resources of type 3:2
                               Enter process T
Enter Allocation Matrix:
                               Firter max[0]: 7
                               Enter max [i]: 5
Enter process 1 allocations:
                               Enter mox [1]: 3
Enter alloc [0]: 0
Enter process 2 max resources 1: [i] solla restra
Enter alloc[2]: 0
                               Enter max(0]: 3
Enter process 2 allocations:
                               Enter max [1]: 9
Enter alloc [0]: 2
                               Enter max[]: 2
Enter alloc [i]: 0
Enter alloc [2]: 0 2900 more & 28000000 tomes
Enter process 3 allocations:
                             Enter max[o]: 9
Enter alloc[o]: 3
                               Enter max[1]: 0
Enter alloc[i]: 6
                               Enter man(a): 2
Enter alloc [2]: 2
Enter process 4 allocations nor 1 2290000 resma
Enter alloc[0]: 2
                              Enter maxio1: 2
Enter alloc (i]: 1
                              ENTER MOXITE: 2
 Enter alloc [2]:
```

```
Enter process 5 allocations:
                                        :TUPUT
Enter alloc [0]:02: 292293000 to radmur rating
Enter alloc [2]: 2 29qui somozer to redmur roting
Enter alloc [i]: 0
       Enter number of resources of type 1: 3
Enter Max Mathix: Essoupeer to osdower ostra
Enter process I max resources: redmur rating
Enter Allocation Matrix: 7: [0] xpm restra
Enter max [i]: 5
                    Enter process 1 allocations:
Enter max [2]: 3
                              Enter alloc [0]: 0.
Enter process 2 max resources! = [1] sollo solla
                                Cortes allocas: 0
Enter max [0]: 3
                     Enter process 2 allocations:
Enter max [i]: 2
                                Enter alloc [0]: 2
Enter max [2]: 2
                                EMER Alloc (1): 0
Enter process 3 max resources o : [3] solls rosting
                    Enter process & allocations:
Enter max[0]: 9
                                Entes alloc [0]: 3
Enter max[i]: 0
                                Enter alloc[i]: 0
Enter max[2]: 2
                                Exter alloc [3]: 2
Enter process 4 max resources to 11 220000 50000
Enter max[0]: 2
                                Enter alloc [0]: 2
                                Enter alloc (1): 1
Enter max[i]: 2
                                 Enter alloc (1): 1
```

Enter max[2]:2

Enter process 5 max resources:

Enter max[0]: 4

Enter max[i]: 3

Enter max [2]: 3

Enter Request Matrix:

Enter request[0]: 1

Enter request[i]: 0

Enter request [2]: 2

Enter process number for request: 1

## OUTPUT:

Resource can be allocated.

The system is in safe state

The order of processes:

1 3 4 0 2

```
write a c program to implement producer
consumer problem using semaphores using
UNIX/LINUX System calls.
                     Sem. wait ( Hill) )
#include estdio.h > (6) thou moe
# include <stdlib.h> bomueros") Itring
# include <pthread.h > (8%) feng-more
# include < semaphore . h > teog_mas
# include < unistd.h > ( ") + DO _ bounder
Sem_t s, full, empty;
                                     int main ( )
int i;
                        pthread-t tite;
chas buf [200];
                     Sem-init (Kempty, O.D.)
Sem_init (Afull, o(esp * biov) resuborg * biov
 sem init (Ls, 1); (+tiis picati) rofull);
1
 phread-coer (Lydmes) thousands should
            Sem-wait (45) 3 mioi-bosonta
            buf [i] = i 3
            printf('Broduced item is 1.d", buf [i);
            Sem_post(4s);
            sem-post (4full); 0 el mate basubosq
                             produced item ls 1
      pthread_exit (" "); 0 21 moti bemusino
                            consumed item is 1
```

```
void * consumer (void * arg)
      for (i=0;i<2;i++)
                       the order & MILL & THO
            Sem_wait (4full) 3
            sem - wait (43); < Hoibtes shully
            printf ("consumed item is ;d", buf [i]);
            sem-post (&s); ed bosentig > shulami th
            sem-post (fempty);
      pthread -exit (" "); < r. bteins > sbuloni #
4
                           Sem-t situll, empty;
int main ()
                                        int is
        pthread_t t1, t2;
                                chas but [200] ;
        Sem-init (kempty, 0, 1);
        Sem-init (4full, 0,0); * biov) resuborg * biov
        sem_init(&s,1,1);
        Pthread_Create (At, NULL, producer, NULL);
        pthread-create (&tz, NULL, consumer, NULL);
        pthread-join (ti, NULL);
        pthread-join (t2, NULL); mos
                          i I= [i] hud
printf("Boduced item is -1d", but [i]; ?
                      Sem_post(43);
OUTPUT:
produced item is 0 (111) 1209 mas
produced item is
                       pthocad.exit (" ");
consumed item is 0
consumed item is
```

```
covite c programs to illustrate following IPC
mechanisms
                       (10Se (-Pates):
a) pipes
                   sead ( Pd [0], SI, 1);
# include estdioth > possem") Italia
# include < unistd.h > : (12)esug
# include < stdlib.h >
# include < string.h>
int main()
                      Close (falos):
3
                  (23)te (4d(13,5,1);
 · ("m sint scriding, fd[2].) Hisa
       char 5[20], 51[20];
        if (pipe (fd) == -1)
                printf ("pipe not created "n");
                exitli);
                             Enter message: Anuroop
         printf ("Enter message: ");
        gets(s);
                              Message sent into pipe
         cid = fork();
                                         Message is:
         L=Stylen(s);
                                         - Anwood
         if (cid ==-)
               printf ("process not created in");
               exit(o)3
```

```
of I prof (cid = =0) de un of amorphora a strong
                  close (fati);
                  read (fd[0], SI, i);
                  printf (" message is it in i); shulsmit
                                the molude - umistans
                   puts(si);
                                at firelyde < stallib-h >
                                # include < storing.h >
         else
                                           ( ) Walnut July
                   close (fd[o]);
                   write (fd[],5,1);
                   printf ("message sent into pipe In");
                          char steed, sited:
                          (1-== (b4) eqiq) fi
3
printf ("pipe not exected "" Fring
                               exit(1);
Enter message: Anuroop
                 paint ("Enter message: ");
OUTPUT:
                                      gets(s);
Message sent into pipe
                                cid = fooken;
Message is:
                                (3) = Stolen(S);
   -Anuroop.
                                 (i-== bis) 4i
    paint? ("process not coached in");
                               E(0) 17 x9
```

```
Hindude - Haio hs
6) FIFOS
                              thindude - stallb-ti
#include <stdio-h >
                              +1 include < fentl. h >
#include < unistd.h >
                             Hirolade esystetet hs
# include <string.h>
                            # include esystypes.h>
# include < fentl.h >
                                       ( DIVIDING JAI
# include < sys | stat. h >
 int main()
                                   i bi toi
               chas & myff = " /home / fifo";
 1
       int id;
       char * myff = "/home/fifo";
       char s[20]; 000 (19 pm) 1000 = bi
        id = open (myff, o-WRONLY); b) seeds
        printf ("Enter msg:");
        get(s);
        write (id, s, stolen(s)+);
                                         1709700
         close (id);
                                          Kinku.
 3
 INPUT!
  Enter msg: Rinku
```

```
POTT 361
#include Zstdio.h>
#include < stdlib-h >
                              e doiltes shulomitt
#include < fontl.h >
                             ed. bleine = stubrift
# include < sys|stat.h>
                             et friede string. hs
# include < sys types h >
                             the frictuals - Reptl. h >
                          # include eggs statets
int main()
3
                                      int maines
       int id;
        char + myff = "/home/fifo";
                                     ¿ bì Jai
        chay 5[20];
         mkfifo(myff;0666); - thum + onlo
         id = open (myff, o-RDONEN); rodo
          read (id, 5, 30);
          close (id) (KINOAN-O, FTYM) 1990= bi
          put(s); (" extres meg; "); (e)thing
                                   def(s)?
3
                  worte (id, s, stolen(s)+1);
OUTPUT:
                                : (bi) 920/5
Rinku.
                                           17 1961
                               Enter mag: Rinku
```

```
c) Message Queues
                           - Adibtes abubility
                       of a squit option of the
# include < stdio.h >
# include < sys/types h> and parelypes shubit
# include < sys/msg.h >
struct message
                           long mesquegation
                        chow mesq text [roots
      long mesg_type;
                                          : Parry
      char mesg-text[100]:
3 msg;
                                     Common thi
int main()
                           hey t key = 6:
                             i bipem sim
       int misgid; occo; bipem this
    msgid = msgget (key, 06661 IPC - CREAT);
       misg-mesg_type=13, "a-14") Haring
       printfliwrite Data: "Diper ) 15000
       gets (msg. mesg-text);
       msgsnd (msgid, kmsg, size of (msg),0);
                                           Rivilen
 INPUT:
  write Data: Rinku
```

```
# include <stdio.h >
                             SMESSING GUELDMG
Hindlude < systypes - h>
                            Himolude < stations
#include <sys/msg.h>
                         +1 include < systypes h>
                          # irrolude < sys/msg.h >
struct message
                                struct message
    long mesq type;
     char mesg-text[100];
                           Long mesq-type;
                      Char mesg-text [100]:
&msq;
                                          : BSM &
int main()
                                    int mains
      key_t key = 6;
       int magid;
      msgid = msgget (key, 0666) IPC-CREAT);
   msgrev (msgid dmsg, sizeof (msg), 1, 0);
       printf("In"/s", msg. mesg_text);
       msgctl (msgid, IPC-RMID, Null);
                    gets (msg. mesg. text);
3
     megend (megid, kmeg, size of (meg), o);
OUTPUT:
Rinku
                            write lata: Rinky
```

edicidities station it d) shared Memory ed sortet spe- study of the # include <stdio.h > द ते अमें (eps > 960) में क # include < systypes . h > + Horde Leges shown It # include < sys/shm.h > #include <syslipc.h> int main() key t key = 6 3 : (masso key to Rey = (6; ) topmore = bimmle this int shmid = shmget (key, 1024, 0666) IPC-CREAT); char \* str = (char \*) shmat (shmid, (void \*)0,0); printf ("Enter Data: "); ("ta) flowed gets (sto); OIMR-29I . Bimde) Homde 3

WHEEL ST

INPUT:

Enter Data: Rinku

# include <stdio.h> promon Lauret (E) # include < sys types. h > Hindude <stdio.h > # include < syslipc.h > It include < systypes h > # include <sys/shm.h > it include < sys shm.h > thinclude sayslipe. hs int main () ( Driom fri key t key = 63 int shmid = shmget (key, 1024, 0666) IPC\_CREAT); char \* str = (char \*) shmat (shmid, (void \*) 0, 0); : (0,0 ( printf ("1/15/1)" 1 sto) = 012 + 0000 print ("Enter Data: "); (sta) + bmde shmot (shmid, IPC-RMID, NULL); 4 OUTPUT: TUPLIT Rinku Enter Data: Rinku

```
write a program to simulate following memory
management techniques
a) paging
                      Enter lagical address: 11
# include < stdio. h >
                           Enter page size: 4
int maine
3
     int i, ladd, psize, ptable [10]; most som
     int pageno, offset, phyadd, n;
      printf ("Enter number of pages: ");
                                            8
      Scanf ("/.d", (n);
      printf (" Enter logical address: ");
       Scanf (" -/-d", &ladd);
       printf ("Enter page size: ");
       Scanf ("1.d", & psize); addo losie und ent
        pointf ("Enter frame numbers: (n");
        for (i=0;i2n;i++)
                scanf (",d", &ptable [i]);
        pageno = ladd psize;
        offset = ladd 1/ psize;
        phyadd = ptable [pageno] * psize + offset;
        printf ("The physical address is: ".d".
                       Phyadd);
```

3

OUTPUT! INPUT: Johnie of morpor a stoco Enter number of pages: 4 Enter logical address: 11 # include < stdie h > Enter page size: 4 int maine Enter frame numbers: esiza, bbol i tri int pageno, offset, phyadd, n; 2 printf ("Enter number of pages: "); 3 Scanf ("1.d", (n); printf (" Enter logical address: "); Scant ("+d", & ladd): The physical address 15:15 the physical address 15:15 the physical address 15:15 point ("Enter frame numbers: (m?); for (i=0;izn;i++) scanf (",d", & ptable [i]); pageno = ladd psize; offset = ladd " psize; phyadd = ptable[pageno] + psize + offset; printf ("The physical address is: ".d". : (bboping

```
6) Segmentation (2290 501 13") Hiring
  # include < stdio.h >
            scanf ("+d", Lass (i). offset
  struct segment
      int Segno: " on trampez sofra") Hising
   int baseadd; (on post, "b") frose
int limit; on= < timil·lon-ess) orn) fi
        int offset;
         ass [seg-no]. offset;
       main ()
   printf ("The physical address is ?
         int biomisseg ino, phyadd;
          struct segment arr[10];
          pointf ("Enter number of segments: ");
     eint scanfo(" rod" billov Joh") I trieg
          for (i=0;(i≤n;i++)
                   printf("Enter "d Segno: ",i);
                   scanf (".1.d", daro [i] segno);
                    printfluenter of do baseaddress:
Has : Insmose of o segscarf (" v.d", fare (1) baseadd); 1940
                    printf ("Enter 7 d timit : ", i) in
              Scanflu "d", lavo [i]. Timits;
```

```
printf ("Enter offset of 1-d
                           segment : ", i);
                scanf("1.d", dars[i]. offset);
                                    stauct segment
         printf ("Enter segment_no: ");
         scanf (".d", & seg_no); bbosed triet)
if (arr [seg_no]·limit > = arr [seg_no].offset)
                phyadd = arr [seg_no]. baseadd +
                           arr [seg-no]. offset;
                                        int main ()
                 printf ("The physical address is ; bbound, on disphyadd);
                    struct segment applied;
   point f (" Enter number of segments ");
               printf ("Not valid offset for this
                         segment");0=1) 801
paintf ("Enter 1.d segno: ", 1); 2
Enter number of segments. In Iron
Enter 1 segno = 05 1 sofm " ) 9 tring
Enter of base address: 2514
Enter offset of 0 segment: 254
 enter o limit 514 Enter
output: The physical address is: 2768.
```

```
write programs using I/O system calls of UNIX
LINUX operating system
(open, read, write, close, fonth, seek, stat)
#include <stdio.h>
                                  (161) - ola
#include < unistd.h >
+ include < fontl. h >
# include < sys | stat. h >
#include <sys types.h>
                            ET : 2 most immitted for organizate
int main ()
                                            2 History
                                            Pl af asia
       int n, fd, fdr, i, fd2;
        char buff[50], buffi[50];
        Stouct stat s:
        fd = open ("Sample txt", O_CREAT 1 O_RDWR, 0666);
        n=vead (td, buff, 18);
         pointf ("Numbers of characters: ",d", n);
        fd1 = open ("aaa.txt", O-CREAT 1 O-ROWR, 0666);
         write (fdi, buff, n):
         fd2 = open ("abc.c", 0_ROWR, 0666);
         lseek (fd2, 9, SEEK_SET);
         Dead (fd2, buff, 9);
        for (i=0; i<9; i++)
                pointf ("xc", bufficis);
```

```
Stat ("Sample. txt", &s);
          printf ("Insize is "d", s.st-size);
          close (fd);
          close (fdi);
           close (fd2);
OUTPUT :
                               + Handle establish
Number of characters: 18
<stdio.h >
size is 19
                       : [02] 179 ud . [02] Thed orado
                                 : 2 Juste for se
13 - open ("Sample txt" O CREAT 1 O REWR, OCCO);
                         : (81.7) rd (bt) besso = 14
     int ("by: 2001) and of characters: " Ad", ");
  FAI = OPEN ("TARA TXT", O. CREAT O. ROWR, O SEE)
                           (Gr. Hud (167) offices
          (do open ("abus") o ROWE , OGGO);
                 :((i) Il lud "sa") Ismisq
```

```
(opendir, readdir)
# include < stdio.h >
# include < unistd.h >
# include < fcntl.h>
# include < sys | types. h >
# include < divent .h >
int main()
        struct divent *d;
         DIR * dr = opendir ("/home/systemno-13/18551A0516");
         while ((d=readdir(dr))!=NULL)
                    printf ("1.sin"; d >d-name);
          closediv (div);
3
OUTPUT:
· Syscall · c
. div. c
· yound Robin.c
.SJF.C
```