Creating Threads in Java 4) By implementing Runnable Interface -> By Extending Thread day 1) create a class by implementing 1) weate a class by extending thread sunnable interface 2) provide definition for thead 2) Provide definition for the thread by overriding sunc method. by implementing sunco method 3) create object for the class which implements Runnable interface. 3) create object for the class which 4) create an object for Thread class extends the thread class and (of the day)

4) call the sun method using stacks method. of pass sunnable interface object as the argument-5) call the start method then the sun method will be executed 9 impact jan lang x; import java lang. *; Odas Mytheead extends Theead Delass MyTheead implements Runnable Opublic void sun() public void sun () Katoland in pla. fus (int i=0; i <10; i+t) for (int 1=0; 1<10; 1++) f s.o.p (" child Theead"); S.O.P (" child Theread") dass Test class Test public static void main (Steing agesc) I public static unid main (Steing agric) MyTheead to = new MyTheeado; 3 MyThread I = new MyThread() Thread to = new Thread (ti); (4) t. startes; to start & could start into nally for(int i=0; i<10; i+1) lementer for (int i=0; i <10; i++). s.o.p(" Main Theedo new Thee ad that
3 executes tt. 5.0- P(" Main Theead") weither in gun() olp child Theead } 10 times child Thread child Thread Main Thread Main Thread 2 10 times Main Thread child Thread.

creating multiple Theeads by extending Thread class (Thread schedules (i) creating multiple Thread using multiple classes which extends the adjuster which extends the adjuster with the adjus ment of multiplying 13 spenting first 5. odd numbers
Signatural class Theearth 1 to 5 by 2 public void sunc) for (int i=1; i <=5; i++) System.out. pentln ("TheeadA : +(-1*i)). Thread A: -1 ThreadA: -2 class TheeadB extends Theead Theeads; 2 public vord sun() Theradc: 1 for (int j=1', j' <=5', j'+1) System out printles ("ThreadB;" + (2*j)), class Therade extends Therad [public void sunc) for (int k=1; k=5; k++) System out pents ("Threadc: " +((k * 2) -1)); class Multiple Theead Class Deno public static void main (Steing ags C) Therack to = new ThreadA(); Threads to = new ThreadB(). Thread (t3 = new Thread ((); tistactos: } t2. stack();

(2) creating multiple threads using single class that extends (3) class MyTheead extends Theead Steiny name; MyTheead (Steing n) ThreadA: 1 TheeadB: 1 f name = n; Thread # : 2 public void sunci TheeadB: 2 for (int. i= 1) 1 = 5; i++) 3 system out pent In ("name": "+i). class Multiple Thread Demon public static void main (Steing augs []) MyTheraid to = new MyTheraid ("Theraid A"). MyThread to = new MyThread ("Thread B") 1. start co to started

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creating multiple Threads exing by Implementing Runnable Interface
1) create Multiple Theracks using multiple classes that implements
Runnable Interface
  class TheeadA implements Runnable
  Public void sunc
         for (int i= 1; i <=5; i+7)
          { System.out. punlln ("TheeadA ="+(-1 * i));
       System out pent In (" witing TheeadA").
  class TheeadB implements Rumable.
  f public vaid Run ()
     for (int i=1, j <=5; j+1)
          System out pents (" TheeadB =" + (2+j)).
      & system-out pends (" Exiting Theeads").
   class Multiple Theeads
                                                     Thread A = -1
  f public static void main (String args c)
                                                     Thread B = 2
     ThreadA Obji = new ThreadA ();
                                                      Thread A = -2
                                                      Thread # = 3
       Thread to = new Thread (obji).
                                                      Theod B = 4
       ThreadB objz = new ThreadB ();
                                                      PheeadB = 6
```

Thread to = new Thread (obj2).

ti-startes;

te. startes.

ThreadB = 8 ThreadB = 10

Exiling Theead B

Thread A = -4

TheeadA = -5

Exiting Theead A

@ creating multiple thread using single does that at implements Rumable Inlabee class MyTheead implements Runable String name; My Theead (String in) 0/0 name = n; TheadA: 1 TheeadA: 2 public void sunc) TheeadB: 1 for (i=1; i <=5; i+1) The adA:3 { System out pent In (name +":"+i). TheeadB: 2 T-12-17 class Multiple Theead Demo public date doid main (Steing ags CD) My Thread dobje = new My Thread ("Thread A").

Thread to = new Thread (obji):

My Thread obje = new My Thread ("Thread B").

Thread to = new Thread (obje):

to start of: tz. starter.

Thread Synchronization is Java

(1) wing synchronization method class Buffer Produces Consume Theead Theead static int count=7. Synchronized void computetemount (String name) count = Øx 2 if (name == "psoduces") int si = count; Shared Buffer. 31 = 81+1; count = SI; executes Threads Count- 718 System out pentlo ("Rodice: count Produce 1) R1 = count suppose order 2) R1 = R1+1 3) Count = P, Internally perform eighter perform using eighter int 82 = count $S_2 = S_2 - 1$ Count = 82 , $P_{1} \rightarrow R_{1} = 7$ System out pentin ("consumes; count=" count=" 12.7 R1 = 8" 1) R2 = count 2) R2=R2-1 $C_1 \rightarrow R_2 = 7$ 3) court = R2 class MyThieach implements Runnable $C_2 \rightarrow R_2 = 6$ Buffes buffer P3 -> count=7 cant do synchronalicos Steing name $C_3 \rightarrow count = 6$ on predefined nethod MyTheradd (Buffer buffer Steng name) sunce is predefined method, vaciable, dais Itus. buffer = buffer only on a use defined method, block data Inconsistancy Rase condition this name = name; i) Synchronize (multiple threads accessing same 2) Sychionize public void sus() buffer compute Item (ound (this pane). Shaced Vaciable/data,) when multiple therads accessing same shared data, then I thread is accessing shared data then we should not allow other thread to access the shared data eg: while produces thread accessing shared buffer then not allow consumer thread to Then can solve Inconsistency phlos

public Jass Theead Synchronization Demo public static word main (String asgSET) Buffer buffer = new Buffer (). MyThreadd produces = new MyThreadd (buffer, "produces"). Thread to = new Thread (produces). MyThreadd consumer = new MyThreadd (buffer, "consumer"). Therad to = new Therad (consumer); Producer: count=8 1. starter; Consumer: count = 7 bz. startc). Consumes: count = 6 produces: count=7 r de la lace de la company de la γ · mile with the i) Synchronized method when I method accessing it none of sychionized blode. instead performing synchronization on entire method, performing on block

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(2) Using synchronzed block | Synchronzed statement
 class Buffer
    static int count=7;
     void compute Item (ount (String name)
        if (name == "produces")
            int si = count;
            S1 = S1+1;
            Count = 91;
            System out penlla ("produces: count"+ count).
           int 82 = count;
           82 = 82 - 1
           Count = 82;
            System. out. peintln (" consumer : count=" +count).
                                             public dass TheeadSyrchionizationless
                                              Spublic state and main (String age)
class My Threadd implements Runnable
                                               Buffer buffer = new Buffer ().
Buffer buffer.
                                                MyTheeadd producer = new MyThead (biffer, "producer")
  String name
  MyTheeadd (Buffer buffer, Steing name)
                                                Therad to new Thread (produces):
  this buffer = buffer
                                                MyTheeadd consumes = new MyThead
  this - name = name
                                                           (buffer "consumes").
  public used sunc)
                                                Thread to = new Thread (consumes)
      Synchronized (this)
                                                  t, startes;
       buther compute Item Count (this name)
                                                  to stactor
                                                     Produce: count-=8
                               Consumes: count=6
                                Produces count=7
                                                    Consumer: court = 7
```

```
class Buffer
   Static int count = 7;
   vaid compute Iteratount (Steing name)
       Synchronized (this) (1)
           if (name == "produces")
            int & = count;
              91=91+1;
              count = Si')
              System out pentls ("produces : count = " + count).
              int 82 = count,
               82 = 82-1%
               Court = 82;
               System. out. peintln ("consumes: count="+count).
                                            public class ThreadSynchronization Dem
                                             public static void main (Steing ages)
class MyThreadd implements Runnable
                                              Buffer buffer = new Buffer();
Buffer buffer;
                                             MyTheeadd produce = new MyTheead
                                                    (buffer, "produces");
  Steing name;
  MyTheeadd (Buffer buffer, String name)
                                             Theead I, = new Thread (produce).
                                              MyTheeadd Consumer = new MyTheeadd
  this buffer = buffer ;
                                                    (buffer, 'consumer').
    lhis name = name
                                                ti-stactes;
  public void sun ()
                                                tz. stack);
    buffer. compute Item Count (this name)
                                                   0/2
                                                 Consumer : count = 6
```

Produces: count = 8 Consumer: count=7 Produce: count = 7