```
ClassA run() : 344901
8
           int count=1;
                                                                        ClassA run(): 344902
9
           while(true)
                                                                        ClassA run() : 344903
10
                                                                        ClassA run() : 344904
11
               System.out.println("ClassA run(): "+count++);
                                                                        ClassA run(): 344905
12
                                                                        ClassA run() : 344906
13
                                                                        ClassA run() : 344907
140
       public static void main(String[] args)
                                                                        ClassA run(): 344908
15
                                                                        ClassA run(): 344909
16
           ClassA aobj=new ClassA();
                                                                        ClassA run() : 344910
17
                                                                        ClassA run() : 344911
18
           Thread t=new Thread(aobj);
                                                                        ClassA run(): 344912
19
           t.start();
                                                                        ClassA run() : 344913
20
                                                                        ClassA run() : 344914
21
           for(int i=1;i<=20;i++)
                                                                        ClassA run() : 344915
22
                                                                        ClassA run(): 344916
23
               System.out.println("main() : "+i);
                                                                        ClassA run() : 344917
24
                                                                        ClassA run() : 344918
25
       }
                                                                        ClassA run() : 344919
26 }
                                                                        ClassA run() : 344920
27
                                                                        ClassA run() : 344921
28
```

```
main() : 7
 3 public class ClassA extends Thread
                                                                        main() : 8
 4 {
                                                                        main() : 9
5=
       @Override
                                                                        main(): 10
6
       public void run()
                                                                        main(): 11
 7
                                                                        main() : 12
 8
           int count=1;
                                                                        main(): 13
 9
           while(true)
                                                                        main(): 14
10
                                                                        main(): 15
               System.out.println("ClassA run(): "+count++);
11
                                                                        main() : 16
12
                                                                        main(): 17
13
                                                                        ClassA run(): 69
149
       public static void main(String[] args)
                                                                        ClassA run(): 70
15
                                                                        ClassA run(): 71
16
           ClassA aobj=new ClassA();
                                                                        ClassA run(): 72
17
                                                                        ClassA run(): 73
           Thread t=new Thread(aobj);
18
                                                                        ClassA run(): 74
19
           t.setDaemon(true);
                                                                        main(): 18
20
           t.start();
                                                                        ClassA run(): 75
21
                                                                        €lassA run(): 76
22
           for(int i=1;i<=20;i++)
                                                                        main() : 19
23
           {
                                                                        main(): 20
24
               System.out.println("main() : "+i);
```

## **Daemon Thread**

A daemon thread in java is a type of thread that runs in the background and does not prevent the JVM from existing when the program finishes executing.

In other words when all the non-daemon threads in a program have finished their execution then JVM will automatically terminate Daemon thread.

A daemon thread is a low priory, infinite execution thread which supports in the background of a java program.

Example: Garbage collector.

- 1) What is a Thread?
- 2) Which Thread by default runs in every java program?
- 3) What is the default priority of the Thread?
- 4) How can you change the priority number of the Thread?
- 5) Which method is executed by any Thread?
- 6) How can you stop a Thread which is running?
- 7) Explain the two types of multitasking?
- 8) What is the difference between a process and a Thread?
- 9) What is Thread scheduler?
- 10) Explain the synchronization of Threads?
- 11) What is the difference between synchronized block and synchronized method?
- 12) What is Thread deadlock? How can you resolve deadlock situation?
- 13) Which methods are used in Thread communication?
- 14) What is the difference between notify() and notifyAll() methods?
- 15) What is the difference between sleep(100) and wait(100) methods and join()?
- 16) Explain the life cycle of a Thread?
- 17) What is daemon Thread?// Garbage collector

Def: Daemon thread is a low priority thread that runs in background to perform tasks such as garbage collection (gc) etc.,

## clone(), Which is present in Object class

```
1 package com.pack1^
                    1 package com.pack1;
                                                                                                           - D - P -
   public class Clas
                          public class ClassC
                        4 {
                                                                                                           Implementing Ob
      int x=10:
                              public static void main(String[] args)
      int y=20;
                                                                                                           aobj1: 10 20
                                 System.out.println("Implementing Object Cloning\n");
8
                                 ClassA aobi1=new ClassA():
                                 System.out.println("aobj1 : "+aobj1.x+" "+aobj1.y); I
10
                       10
** (
                       12 }
ClassB.java X
                       13
1 package com.pack1^
   public class Clas
                       18
      int a=111;
                       19
      int b=222:
                       20
```

## This not cloning

```
1 package com.pacl^
                            package com.pack1;
                                                                                                                    - E - F -
                                                                                                                    <terminated> ClassC [Java Application] C:\\
   public class Cl.
                            public class ClassC
                                                                                                                    Implementing Object Cla
 4
       int x=10:
                                 public static void main(String[] args)
       int y=20;
                                                                                                            I
                                     System.out.println("Implementing Object Cloning\n");
                                     ClassA aobj1=new ClassA();
                                     System.out.println(aobj1.x+" "+aobj1.y);//10 20
                         10
10
                                     ClassA aobj2=aobj1;
🗓 ClassB.java 🗶
                                     aobj2.y=1000:
· 😂 → 进 → 🕕 → 😉 → △ asint
                                     System.out.println(aobj1.x+" "+aobj1.y+" "+aobj2.y);//10 1000 1000
 1 package com.pacl^
                         16 }
   public class Cl.
                         18
       int a=111;
                         19
       int b=222;
                         20
 1 package com.pack1;
                                                 package com.pack1;
                                                                                                                    <terminated> ClassC [Java Application] C:\
   public class ClassA
                                                 public class ClassC
                                                                                                                    Implementing Object Cla
        int x=10;
                                                     public static void main(String[] args)
       int y=20;
                                                                                                                    10 1000 1000
                                                         System.out.println("Implementing Object Cloning\n")
                                                         ClassA aobj1=new ClassA();
ClassB.java X
                                                         System.out.println(aobj1.x+" "+aobj1.y);//10 20
🤪 Training 🕨 🎏 src 🕨 🏭 com.pack1 🕨 😉 ClassB 🕨
 1 package com.pack1;
                                                         ClassA aobj2=aobj1;
                                                         aobj2.y=1000;
   public class ClassB
                                                         System.out.println(aobj1.x+" "+aobj1.y+" "+aobj2.y)
 4
        int a=111:
                                                         ClassB bobj1=new ClassB();
       int b=222;
                                                         System.out.println(phobj1.a+" "+bobj1.b);
        /*ClassB createClone() throws
            ClassB obj=(ClassB)super.c
10
            return obj;
                                             22 }
                                             23
                                             24
14 }
```

```
package com.pack1;
                                                         package com.pack1;
   public class ClassA
                                                         public class ClassC
       int x=10;
                                                              public static void main(String[] args)
       int y=20;
                                                                  System.out.println("Implementing Object Cloning\n");
                                                                 ClassA aobj1=new ClassA();
ClassB.java X
                                                                 System.out.println(aobj1.x+" "+aobj1.y);//10 20
🔛 Training ▶ 🚜 src ▶ 🚜 com.pack1 ▶ 🧿 ClassB ▶ 🛦 createClone() : ClassB
  package com.pack1;
                                                                 ClassA aobj2=aobj1;
                                                                 aobj2.y=1000;
   public class ClassB
                                                                 System.out.println(aobj1.x+" "+aobj1.y+" "+aobj2.y);//10 1000 1000
       int a=111;
                                                                 ClassB bobj1=new ClassB();
       int b=222;
                                                                 System.out.println("\n"+bobj1.a+" "+bobj1.b);
       ClassB createClone() throws CloneNotSupp
                                                      19
                                                                 bobj1.createClone();
                                                      20
10
           ClassB obj=(ClassB)super.clone();
11
           return obj;
                                                      22 }
12
                                                      23
13
                                                      24
14 }
                                                      25
                                                          Implementing Object Cloning
   package c
                     package com.pack1;
   public cl
                     public class ClassC
                                                          10 1000 1000
                         public static void main(Strin
                                                          111 222
        int y
                                                          Exception in thread "main" java.lang.CloneNot
                                                                                                                           n: com.pack1
    4
                             System.out.println("Imple
                                                                   at java.base/java.lang.Object.clone(Native Method)

☑ ClassB.java ×
                                                                   at Training/com.pack1.ClassB.createClone(ClassB.java:10)
                             ClassA aobj1=new ClassA(
at Training/com.pack1.ClassC.main(ClassC.java:19)
                             System.out.println(aobj1
   package c^
                             ClassA aobj2=aobj1;
   public cl
                             aobj2.y=1000;
 4
                             System.out.println(aobj1
        int a
 6
        int b
                             ClassB bobj1=new ClassB()
                             System.out.println("\n"+1
 88
        Class
 9
                             ClassB bobj2=bobj1.create
 10
                             bobj2.b=1000;
                             System.out.println(bobj1
14 }
                  24 }
15
  1 package com.pack1;
                                                               package com.pack1;
    public class ClassA
                                                               public class ClassC
  4
                                                             4
                                                                   public static void main(String[] args) throws Exception
        int x=10:
        int y=20;
                                                                       System.out.println("Implementing Object Cloning\n");
                                                                       ClassA aobj1=new ClasgA();
☑ ClassB.java ×
                                                                       System.out.println(aobj1.x+" "+aobj1.y);//10 20
> 😂 Training > 📇 src > 🔠 com.pack1 > 🥹 ClassB >
   package com.pack1;
                                                                       ClassA aobj2=aobj1;
   public class ClassB implements cloneable
                                                                       aobj2.y=1000;
                                                                       System.out.println(aobj1.x+" "+aobj1.y+" "+aobj2.y);//10 1000
                                                            14
                                                            15
        int a=111;
        int b=222;
                                                            16
                                                                       ClassB bobil=new ClassB():
                                                                       System.out.println("\n"+bobj1.a+" "+bobj1.b);
                                                            18
  88
        ClassB createClone() throws CloneNotSupported
                                                                       ClassB bobj2=bobj1.createClone();
                                                            19
                                                                       bobj2.b=1000;
 10
            ClassB obj=(ClassB)super.clone();
                                                            20
                                                            21
                                                                       System.out.println(bobj1.a+" "+bobj1.b+" "+bobj2.b);
            return obj;
 12
                                                                   }
                                                           24 }
```

```
1 package com.pack1;
                                                      package com.pack1;
                                                                                                                       public class ClassA
                                                      public class ClassC
                                                                                                                       <terminated> ClassC [Java Ap
                                                                                                                       Implementing Ob-
                                                          public static void main(String[] args) throws Exception
       int y=20;
                                                               System.out.println("Implementing Object Cloning\n")
                                                                                                                       10 1000 1000
                                                              ClassA aobj1=new ClassA();
ClassB.java X
                                                                                                                       111 222
                                                              System.out.println(aobj1.x+" "+aobj1.y);//10 20
Fraining > 5 src > 1 com.pack1 > G ClassB >
                                                                                                                       111 222 1000
 1 package com.pack1;
                                                              ClassA aobj2=aobj1;
                                                               aobj2.y=1000;
   public class ClassB implements Cloneable
                                                              System.out.println(aobj1.x+" "+aobj1.y+" "+aobj2.y")
       int a=111:
                                                              ClassB bobj1=new ClassB();
       int b=222;
                                                              System.out.println("\n"+bobj1.a+" "+bobj1.b);
       ClassB createClone() throws CloneNotSi
                                                              ClassB bobj2=bobj1.createClone();
                                                              bobj2.b=1000;
10
           ClassB obj=(ClassB)super.clone();
                                                              System.out.println(bobj1.a+" "+bobj1.b+" "+bobj2.b)
11
           return obj;
12
                                                   24 }
14 }
```

## **Understanding clone()**

clone() is present in object class which is used to create an exact copy of an existing object without using new key word.

If we want to use clone() in a class, then 100% that class should be inheriting a marker interface (Empty interface) known as Cloneable Interface, otherwise we will be getting clone not supported exception.

```
package com.pack1;
                                                                        package com.pack1;
   public class ClassA
                                                                        public class ClassC
                                                                            public static void main(String[] args) throws Exception
                                                                                System.out.println("Implementing[Object Cloning\n")
                                                                                ClassA aobj1=new ClassA();
                                                                                System.out.println(aobj1.x+" "+aobj1.y);//10 20
Training > 5 src > 1 com.pack1 > G ClassB >
                                                                                ClassA aobj2=aobj1;
  package com.pack1;
                                                                                aobj2.y=1000;
                                                                                System.out.println(aobj1.x+" "+aobj1.y+" "+aobj2.y)
   public class ClassB implements Cloneable
                                                                                ClassB bobj1=new ClassB();
                                                                                System.out.println("\n"+bobj1.a+" "+bobj1.b);
       int a=111:
       int b=222;
                                                                     19
                                                                                ClassB bobj2=bobj1.createClone();
       ClassB createClone() throws CloneNotSupportedException
88
                                                                     20
                                                                                bobj2.b=1000;
                                                                     21
                                                                                System.out.println(bobj1.a+" "+bobj1.b+" "+bobj2.b)
           ClassB obj=(ClassB)super.clone();
10
11
           return obj;
                                                                            }
12
                                                                    24 }
```

```
1 package com.pack1;
 2
 3 public class ClassC
 4 {
 58
       public static void main(String[] args) throws Exception
 6
 7
           System.out.println("Implementing Object Cloning\n");
 8
 9
           ClassA aobj1=new ClassA();
           System.out.println(aobj1.x+" "+aobj1.y);//10 20
10
11
12
           ClassA aobj2=aobj1;
13
           aobj2.y=1000;
14
           System.out.println(aobj1.x+" "+aobj1.y+" "+aobj2.y);//10 1000 1000
15
16
           ClassB bobj1=new ClassB();
           System.out.println("\n"+bobj1.a+" "+bobj1.b);
17
18
19
           ClassB bobj2=bobj1.createClone();
20
           bobj2.b=1000;
21
           System.out.println(bobj1.a+" "+bobj1.b+" "+bobj2.b);
22
23
       }
24 }
```