**import** java.util.\*;

**import** java.io.\*;

**class** Solution{

**public** **static** **void** main(String []argh)

    {

        Scanner sc = **new** Scanner(System.in);

**int** t=sc.nextInt();

**for**(**int** i=0;i<t;i++)

        {

**try**

            {

**long** x=sc.nextLong();

                System.out.println(x+" can be fitted in:");

**if**(x>=-128 && x<=127)System.out.println("\* byte");

**if**(x>=-32768 && x<=32767)System.out.println("\* short");

**if**(x>=-Math.pow(2,31) && x<=Math.pow(2,31)-1)System.out.println("\* int");

**if**(x>=-Math.pow(2,63) && x<=Math.pow(2,63)-1)System.out.println("\* long");

            }

**catch**(Exception e)

            {

                System.out.println(sc.next()+" can't be fitted anywhere.");

            }

        }

    }

}