

```
import collection.mutable.HashMap
```

```
object Change {
```

```
  //val currency = List(25, 10, 5, 1)
```

```
  val currency = List(240, 60, 30, 24, 12, 6, 3, 1)
```

```
  def getDynamicChange(amt: Int) = {
```

```
    // Get the change and put it in an array using a dynamic
    // algorithm.
```

```
    val data = new Array[Float](amt + 1)
```

```
    val denom = new Array[Float](amt + 1)
```

```
    data(0) = 0
```

```
    for (j <- 1 until amt + 1) {
```

```
      data(j) = Float.PositiveInfinity
```

```
      for (i <- currency) {
```

```
        if (j >= i && 1 + data(j - i) < data(j)) {
```

```
          data(j) = 1 + data(j - i)
```

```
          denom(j) = i
```

```
        }
```

```
      }
```

```
    }
```

```
    // Loop through and get the letters.
```

```
    val finalLetters = new HashMap[Int, Int]
```

```
    var j = amt
```

```
    while (j > 0) {
```

```
      val x = denom(j).toInt
```

```
      if (finalLetters.contains(x)) {
```

```
        finalLetters(x) += 1
```

```
      } else {
```

```
        finalLetters(x) = 1
```

```
      }
```

```
      j -= x
```

```
    }
```

```
    // Get a string of the results
```

```
    var out: List[String] = Nil
```

```
    for ((denom, cnt) <- finalLetters) {
```

```
      out ::= "%d(%d)".format(cnt, denom)
```

```
    }
```

```
    out.reverse.reduceLeft(_ + " + " + _)
```

```
  }
```

```
  def getChange(amt: Int) = {
```

```
    var out: List[String] = Nil
```

```
    var workingAmt = amt
```

```
    for (x <- currency) {
```

```
      if (workingAmt / x > 0) {
```

```
        out ::= "%d(%d)".format(workingAmt / x, x)
```

```
      }
```

```
      workingAmt = workingAmt % x
```

```
    }
```

```
    out.reverse.reduceLeft(_ + " + " + _)
```

```
  }
```

```
  def usage = {
```

```
    println("USAGE: change AMOUNT")
```

```
    System.exit(1)
```

```
  }
```

```
  def main(args: Array[String]) = {
```

```
    if (args.length != 1) usage
```

```
// Call the algorithm that will make change for a regular currency.  
val amt = args(0).toInt  
println("Greedy algorithm: " + getChange(amt))  
println("Dynamic Programming algorithm: " + getDynamicChange(amt))  
}  
}
```