A demo for Algorithm2e

Help Document for CS214-Algorithm and Complexity, Xiaofeng Gao@SJTU

1. **An example of If statements(with source code on the left and samples on the right):**

```
\begin{algorithm}[H]
\KwIn{$x$, $y$}
\KwOut{$sign$}
\BlankLine
\caption{$div(x,y)$} \label{Alg-div}
\If{$rm(x,y)=0$}{
    $sign=1$\;
}
\Else{
    $sign=0$\;
}
\Return{$sign$}\;
\end{algorithm}
```

Algorithm 1: $div(x, y)$

Input: x, y
Output: $sign$

1 **if** $rm(x, y) = 0$ **then**
2 | $sign \leftarrow 1$;
3 **else**
4 | $sign \leftarrow 0$;
5 **end**
6 **return** $sign$;

2. **An example of If-ElseIf-Else statements:**

```
\begin{algorithm}[H]
\KwIn{$score$}
\KwOut{Letter Grade}
\BlankLine
\caption{LetterGrade($score$)}
\label{Alg-Score}
\uIf{$score \ge 90$}{
    \textbf{output} $A$\;
}
\uElseIf{$80 \le score < 90$}{
    \textbf{output} $B$\;
}
\Else{
    \textbf{output} $P$\;
}
\end{algorithm}
```

Algorithm 2: LetterGrade($score$)

Input: $score$
Output: Letter Grade

1 **if** $score \geq 90$ **then**
2 | **output** A;
3 **else if** $80 \leq score < 90$ **then**
4 | **output** B;
5 **else**
6 | **output** P;
7 **end**

3. **An example of While statements:**

```
\begin{algorithm}[H]
\KwIn{$x$, $y$}
\KwOut{$x$}
\BlankLine
\While{$x \ge y$}{
$x-=y$\;
}
\textbf{output} $x$\;
\end{algorithm}
```

Algorithm 3: $rm(x, y)$

Input: x, y
Output: x

1 **while** $x \geq y$ **do**
2 | $x- = y$;
3 **end**
4 **output** x;

4. **An example of For statements:**

```
\begin{algorithm}[H]
\KwIn{$n \in \mathbb{N}$}
\KwOut{The sum from 1 to $n$}
\BlankLine
\caption{Sum($n$)} \label{Alg-Sum}
$sum=0$\;
\For{$temp=0$ to $n$}{
    $sum=sum+temp$\;
}
\textbf{output} $sum$\;
\end{algorithm}
```

Algorithm 4: Sum(n)

Input: $n \in \mathbb{N}$
Output: The sum from 1 to n

1 $sum \leftarrow 0$;
2 **for** $temp = 0$ *to* n **do**
3 | $sum \leftarrow sum + temp$;
4 **end**
5 **output** sum;

5. **An example of Repeat-Until statements:**

```
\begin{algorithm}[H]
\KwIn{$a, b \in \mathbb{N}$}
\KwOut{Greatest common divide of $a$, $b$}
\BlankLine
\caption{GCD($a$, $b$)} \label{Alg-GCD}

\Repeat{$gcd=0$}{
    $gcd = a \mod b$\;
    $a=b$\;
    $b=gcd$\;
}
\textbf{output} $gcd$\;
\end{algorithm}
```

Algorithm 5: GCD(a, b)

Input: $a, b \in \mathbb{N}$
Output: Greatest common divisor of a, b

1 **repeat**
2 | $gcd \leftarrow a \mod b$;
3 | $a \leftarrow b$;
4 | $b \leftarrow gcd$;
5 **until** $gcd = 0$;
6 **output** gcd;

6. **An example of Case statements:**

```
\begin{algorithm}[H]
\KwIn{$person$}
\KwOut{$person$'s gender}
\BlankLine
\caption{Gender} \label{Alg-Gender}
\Switch{$person$}{
\uCase{$person.gender=male$}{
\textbf{output} Male\;
}
\uCase{$person.gender=female$}{
\textbf{output} Female\;
}
\Other{
\textbf{output} Unknown\;
}
}
\end{algorithm}
```

Algorithm 6: Gender

Input: *person*
Output: *person*'s gender

1 **switch** *person* **do**
2 | **case** $person.gender = male$
3 | | **output** Male;
4 | **case** $person.gender = female$
5 | | **output** Female;
6 | **otherwise**
7 | | **output** Unknown;
8 | **endsw**
9 **endsw**

For more examples and explanations, please refer to the AlgorithmPackage.pdf help document.