

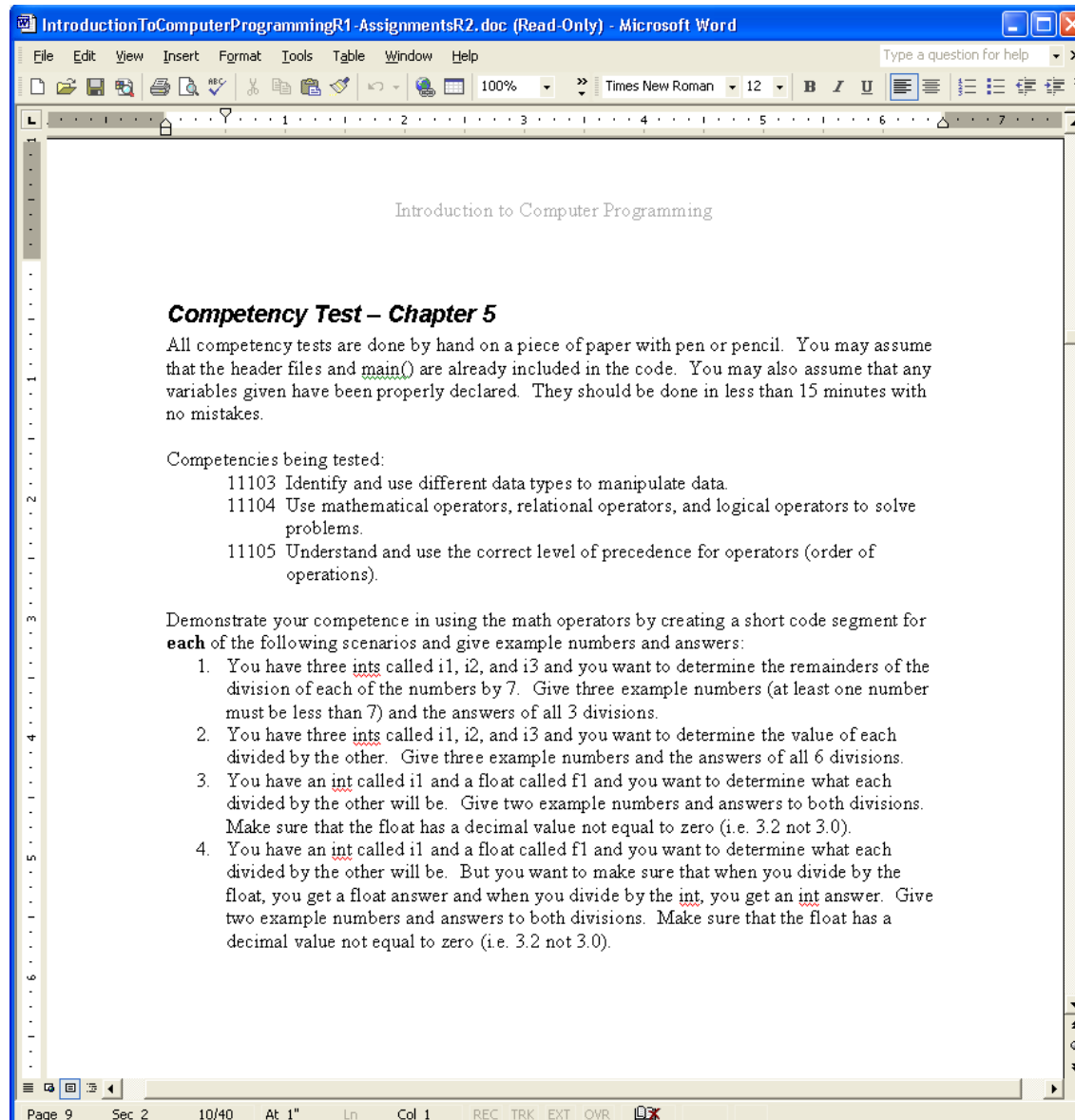
Targets

I can:

- take a competency test

Taking Programming Competency Tests

All competency tests are done by hand on a piece of paper with pen or pencil. You may assume that the header files and `main()` are already included in the code. You may also assume that any variables given have been properly declared. They should be done in less than 15 minutes with no mistakes.



Demonstrate your competence in using the math operators by creating a short code segment for **each** of the following scenarios and give example numbers and answers:

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1. You have three ints called i1, i2, and i3 and you want to determine the remainders of the division of each of the numbers by 7. Give three example numbers (at least one number must be less than 7) and the answers of all 3 divisions.

$i1 = 3;$ $ans1 = i1 \% 7; // 3$
 $i2 = 9;$ $ans2 = i2 \% 7; // 2$
 $i3 = 13;$ $ans3 = i3 \% 7; // 6$
 $int ans1, ans2, ans3;$

Handwritten calculations for remainders:

$\begin{array}{r} 7 \overline{) 13} \\ \underline{10} \\ 3 \end{array}$	$\begin{array}{r} 7 \overline{) 9} \\ \underline{7} \\ 2 \end{array}$	$\begin{array}{r} 7 \overline{) 13} \\ \underline{7} \\ 6 \end{array}$
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Demonstrate your competence in using the math operators by creating a short code segment for **each** of the following scenarios and give example numbers and answers:

2. You have three ints called i1, i2, and i3 and you want to determine the value of each divided by the other. Give three example numbers and the answers of all 6 divisions.

```
i1 = 3;
i2 = 7;
i3 = 8;

int ans;

ans = i1 / i2; // 0
ans = i1 / i3; // 0
ans = i2 / i1; // 2
ans = i2 / i3; // 0
ans = i3 / i1; // 2
ans = i3 / i2; // 1
```

Handwritten calculations for the divisions:

- $3 / 7 = 0$
- $3 / 8 = 0$
- $7 / 3 = 2$ (with a remainder of 1, indicated by a small '1' above the 3)
- $7 / 8 = 0$
- $8 / 3 = 2$ (with a remainder of 2, indicated by a small '2' above the 3)
- $8 / 7 = 1$

Demonstrate your competence in using the math operators by creating a short code segment for **each** of the following scenarios and give example numbers and answers:

3. You have an int called i1 and a float called f1 and you want to determine what each divided by the other will be. You want to make sure that when you divide by the float, you get a float answer and when you divide by the int, you get an int answer. Give two example numbers and the answers to both divisions. Make sure that the float has a decimal value not equal to zero (i.e. 3.2 not 3.0).

```
i1 = 3;    ans1 = i1 / f1; // 1.111
f1 = 2.7;  ans2 = f1 / i1; // 0
float ans1;
int ans2;
```

Demonstrate your competence in using the math operators by creating a short code segment for **each** of the following scenarios and give example numbers and answers:

4. You have an int called i1 and a float called f1 and you want to determine what each divided by the other will be. You want to make sure that when you divide by the float, you get an int answer and when you divide by the int, you get a float answer (hint: use typecasting). Give two example numbers and the answers to both divisions. Make sure that the float has a decimal value not equal to zero (i.e. 3.2 not 3.0).

```
i1 = 3;
f1 = 2.7;

float ans1;
int ans2;

ans1 = f1 / (float) i1; // 0.9
ans2 = i1 / (int) f1; // 1
```