CS1010E 16/17S1 Taxi (Question)

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Task Content

Taxi Taxi!!!

Topic Coverage

- Selection control statement
- Assignment and expressions

You may use other programming constructs, but **do not** use the math library functions.

Topic Coverage

A simplified fare structure taken from `www.taxisingapore.com/taxi-fare` is given below.

Meter Fare	Normal	Limousine	Chrysler
Flag-Down (inclusive of 1st km or less)	$3.40	$3.90	$5.00
Every 400m thereafter or less up to 10km	$0.22	$0.22	$0.33
Every 350 metres thereafter or less after 10 km	$0.22	$0.22	$0.33

Midnight surcharge (applicable at time of boarding)	Additional
Midnight to 5.59am	50% of metered fare

Peak hour surcharge (applicable at time of boarding)	Additional
Mon - Fri: 6.00am to 9.30am	25% of metered fare
Mon - Sun: 6.00pm to 23.59pm	25% of metered fare

Using the fare structure above, your task is to write a program to compute the taxi fare given the follow input:

Type of Taxi
`1` for Normal, `2` for Limousine, `3` for Chrysler

Distance travelled
An integer number (in m) > `0`

Day of travel
`1` for Monday, `2` for Tuesday, ..., `7` for Sunday

Hour of travel
An integer number between `0` (midnight) to `23` (11pm)

Minute of travel
An integer number between `0` to `59`

Note that the Day, Hour and Minute denotes the time of boarding.

As an example, the input

```
1 12500 6 18 33
```

represents boarding a `normal` taxi on `Saturday 6.33pm` for a total travel distance of `12500m`. The corresponding fare is computed as follows:

Flag-Down (inclusive of 1st km or less)	$3.40	1m to 1000m
Every 400m thereafter or less up to 10km	$0.22 x 23 = $5.06	22 cents charged at 1001m, 1401m, ..., 9401m, 9801m
Every 350 metres thereafter or less after 10 km	$0.22 x 8 = $1.76	22 cents charged at 10001m, 10351m, 10701m, ..., 12101m, 12451m
Metered fare	$10.22	
Peak-hour surcharge	25% of $10.22 = $2.55	(remaining $0.005 discounted)
Total fare	$12.77	

As a goodwill gesture, fares with denominations of 9 cents or less will be absorbed by your friendly taxi driver. Hence the actual fare paid is $12.70.

Take note of the following:

- Assume that the distance travelled is greater than zero;
- To avoid imprecision in floating point representations, all fares are to be computed in terms of integer cents.

This task is divided into several levels. Read through all the levels (from first to last, then from last to first) to see how the different levels are related. **You may start from any level.**

- **Deadline: Submit your work to CodeCrunch by Thursday, 8 September, 23:59:59.**

Level 1

Name your program `taxi1.c`

Write a program that reads in the set of five integer inputs, and outputs each value on a separate line.

The following is a sample run of the program. User input is underlined. Ensure that the last line of output is followed by a newline character.

```
$ ./a.out
1 12500 6 18 33
1
12500
6
18
33
```

To proceed to the next level (say level 2), copy your program by typing the Unix command

```
cp taxi1.c taxi2.c
```

```
cp taxi1.c taxi2.c
```

Level 2

Name your program `taxi2.c`

Write a program that reads in the set of five integer inputs. Based on the type of taxi, output the flag-down charge and rate (in cents) on separate lines.

The following is a sample run of the program. User input is underlined. Ensure that the last line of output is followed by a newline character.

```
$ ./a.out
2 1001 5 5 59
390
22
```

```
$ ./a.out
3 1400 6 6 0
500
33
```

```
$ ./a.out
1 12500 6 18 33
340
22
```

To proceed to the next level (say level 3), copy your program by typing the Unix command

```
cp taxi2.c taxi3.c
```

Level 3

Name your program `taxi3.c`

Write a program that reads in the set of five integer inputs. Output the metered fare (in cents) for the first 10km. No surcharge is applied. You may assume that the total distance travelled will not exceed 10km.

The following is a sample run of the program. User input is underlined. Ensure that the last line of output is followed by a newline character.

```
$ ./a.out
1 1000 1 0 0
340
```

```
$ ./a.out
2 1001 5 5 59
412
```

```
$ ./a.out
2 9999 5 9 30
896
```

```
$ ./a.out
3 10000 5 9 31
1259
```

To proceed to the next level (say level 4), copy your program by typing the Unix command

```
cp taxi3.c taxi4.c
```

Level 4

Name your program `taxi4.c`

Write a program that reads in the set of five integer inputs. Output the metered fare (in cents) for the total distance travelled. No surcharge is applied.

The following is a sample run of the program. User input is underlined. Ensure that the last line of output is followed by a newline character.

```
$ ./a.out
2 1001 5 5 59
412
```

```
$ ./a.out
1 1401 1 6 0
384
```

```
$ ./a.out
1 10000 6 18 33
846
```

```
$ ./a.out
1 12500 6 18 33
1022
```

To proceed to the next level (say level 5), copy your program by typing the Unix command

```
cp taxi4.c taxi5.c
```

Level 5

Name your program `taxi5.c`

Write a program that reads in the set of five integer inputs. Output the total fare (in cents) with surcharge applied, if any. All fractional surcharge of less than one cent should be ignored.

Hint: Find a way to represent the time to simplify the check for peak hour or midnight surcharges.

The following is a sample run of the program. User input is underlined. Ensure that the last line of output is followed by a newline character.

The following is a sample run of the program. User input is underlined. Ensure that the last line of output is followed by a newline character.

```
$ ./a.out
2 1001 5 5 59
618
```

```
$ ./a.out
1 1401 1 6 0
480
```

```
$ ./a.out
1 10000 6 18 33
1057
```

```
$ ./a.out
1 12500 6 18 33
1277
```

```
$ ./a.out
1 1000 5 8 31
1277
425
```

To proceed to the next level (say level 6), copy your program by typing the Unix command

```
cp taxi5.c taxi6.c
```

Level 6

Name your program `taxi6.c`

Write a program that reads in the set of five integer inputs. Output the actual taxi fare that will be paid. Note that the fare (computed in cents) must be output in the usual representation in terms of dollars and cents. *Don't forget to give your thanks to the friendly taxi driver.*

The following is a sample run of the program. User input is underlined. Ensure that the last line of output is followed by a newline character.

```
$ ./a.out
2 1001 5 5 59
$6.10
```

```
$ ./a.out
1 1401 1 6 0
$4.80
```

```
$ ./a.out
1 10000 6 18 33
$10.50
```

```
$ ./a.out
1 12500 6 18 33
$12.70
```

```
$ ./a.out
1 1000 5 8 31
1277
$4.20
```

Submission (Course)

Select course: CS1010E (2016/2017 Sem 1) - Programming Methodology ▼

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