

Worksheet 3 - Jake Richards

by Jake Richards

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Name: _____

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WORKSHEET 3 – TESTING (Olympic Athlete)

1. Original code:

[Copy and paste your original code from Moodle into this box. Do not change it.]

```
#define _CRT_SECURE_NO_WARNINGS
#include <stdio.h>
#include <math.h>

void main()
{
    float winAthlete[5];
    float sndAthlete[5];
    float worldRecord, olympicRecord, overallLap{}, averageLap{}, fastestLap, slowestLap{},
time{};

    printf("Please enter the latest lap times (in seconds....)\n");
    for (int i = 0; i < (sizeof(winAthlete) / sizeof(winAthlete[0])); i++)
    {
        printf("Lap %d: ", i + 1);
        scanf("%f", &winAthlete[i]);
    }

    printf("\nWhat is the world record attempt? ");
    scanf("%f", &worldRecord);

    printf("What is the olympic record attempt? ");
    scanf("%f", &olympicRecord);

    fastestLap = winAthlete[0];
```

```

for (int i = 0; i < (sizeof(winAthlete)/sizeof(winAthlete[0])); i++)
{
    overallLap = overallLap + winAthlete[i];
    averageLap = overallLap / 5;
    if (fastestLap > winAthlete[i])
    {
        fastestLap = winAthlete[i];
    }
    if (slowestLap < winAthlete[i])
    {
        slowestLap = winAthlete[i];
    }
}

printf("\nHere is the Winner's statistics: \n");
printf("1. Overall time was: %.3f seconds.", overallLap);
printf("\n2. Average time was: %.3f seconds.", averageLap);
printf("\n3. Fastest time was: %.3f seconds.", fastestLap);
printf("\n4. Slowest time was: %.3f seconds.", slowestLap);

// Check if the overall lap was slower or faster than the Olympic Record.
if (olympicRecord > overallLap)
{
    olympicRecord = olympicRecord - overallLap;
    printf("\n\nA new Olympic record!");
    printf("\nYou were -%.3f seconds faster than the Olympic record!",
olympicRecord);
}
else
{
    olympicRecord = overallLap - olympicRecord;
}

```

```

        printf("\nYou were +%.3f seconds slower than the Olympic record.",
olympicRecord);
    }
    // Check if the overall lap was slower or faster than the World Record.
    if (worldRecord > overallLap)
    {
        worldRecord = worldRecord - overallLap;
        printf("\n\nA new World record!");
        printf("\n\nYou were -%.3f seconds faster than the Olympic record!",
olympicRecord);
    }
    else
    {
        worldRecord = overallLap - worldRecord;
        printf("\n\nYou were +%.3f seconds slower than the World record.",
worldRecord);
    }

    printf("\n\nPlease now enter the 2nd place finisher's lap times:\n");
    for (int i = 0; i < (sizeof(sndAthlete) / sizeof(sndAthlete[0])); i++)
    {
        printf("Lap %d: ", i+1);
        scanf("%f", &sndAthlete[i]);
    }

    for (int i = 0; i < (sizeof(sndAthlete) / sizeof(sndAthlete[0])); i++)
    {
        if (winAthlete[i] > sndAthlete[i])
        {
            time = winAthlete[i] - sndAthlete[i];
            printf("\nLap %d was +%.3f seconds slower than the 2nd place.",
i+1,time);
        }
        else

```

```
        {  
            time = sndAthlete[i] - winAthlete[i];  
            printf("\nLap %d was -%.3f seconds faster than the 2nd place.", i+1, time);  
        }  
    }  
}
```



2. Code Testing

For each test below, run your code and show the results of the scenarios below. Present a screenshot of what happened when the programme ran. Did the programme behave correctly or did it do something unexpected, and if so, why?

a) Test a lap time for your programme:

- i) 56.7 seconds
- ii) 5 seconds
- iii) -4 seconds
- iv) 53444 seconds

b) Using the same five lap times for the winning athlete/2nd placed athlete as the sample output shown on the Worksheet:

Examine each statistic (1-6) and comment on whether the correct answer(s) are displayed or not. (If any statistics were incomplete after Phase 1 (code completed in class) simply note "Unfinished" for that statistic)

c) Test two further sets of lap times of your own choice.

d) Check that the 2nd placed competitor's times are reasonable (ie the overall time should not be faster than the winning athlete's)

Template for tests:

Test: a) 56.7 seconds

Screenshot(s) of output:

```
Please enter the latest lap times (in seconds....)
Lap 1: 56.7
Lap 2: 56.7
Lap 3: 56.7
Lap 4: 56.7
Lap 5: 56.7

What is the world record attempt? 283.13
What is the olympic record attempt? 285.15

Here is the Winner's statistics:
1. Overall time was: 283.500 seconds.
2. Average time was: 56.700 seconds.
3. Fastest time was: 56.700 seconds.
4. Fastest time was: 56.700 seconds.

A new Olympic record!
You were -1.650 seconds faster than the Olympic record!

You were +0.370 seconds slower than the World record.

Please now enter the 2nd place finisher's lap times:
Lap 1:
```

Result: Did the programme behave as expected ie syntactically and logically correct?

YES

Provided correct overall, average, fastest and slowest times. Additionally provided correct relative time between Olympic and World record.

(Copy and paste box above for each of the rest of the tests)

Test: a) 5 seconds

Screenshot(s) of output:

```
Please enter the latest lap times (in seconds...)
Lap 1: 5
Lap 2: 5
Lap 3: 5
Lap 4: 5
Lap 5: 5

What is the world record attempt? 283.13
What is the olympic record attempt? 285.15

Here is the Winner's statistics:
1. Overall time was: 25.000 seconds.
2. Average time was: 5.000 seconds.
3. Fastest time was: 5.000 seconds.
4. Fastest time was: 5.000 seconds.

A new Olympic record!
You were -260.150 seconds faster than the Olympic record!

A new World record!
You were -260.150 seconds faster than the Olympic record!

Please now enter the 2nd place finisher's lap times:
Lap 1: |
```

Result: Did the programme behave as expected ie syntactically and logically correct?

YES

Provided correct overall, average, fastest and slowest times. Additionally provided correct relative time between Olympic and World record.

Although, there is a spelling error. Should be World not Olympic for second relative.

Test: a) -4 seconds

Screenshot(s) of output:

```
Please enter the latest lap times (in seconds...)
Lap 1: -4
Lap 2: -4
Lap 3: -4
Lap 4: -4
Lap 5: -4

What is the world record attempt? 283.13
What is the olympic record attempt? 285.15

Here is the Winner's statistics:
1. Overall time was: -20.000 seconds.
2. Average time was: -4.000 seconds.
3. Fastest time was: -4.000 seconds.
4. Fastest time was: 0.000 seconds.

A new Olympic record!
You were -305.150 seconds faster than the Olympic record!

A new World record!
You were -305.150 seconds faster than the Olympic record!

Please now enter the 2nd place finisher's lap times:
Lap 1: |
```

Result: Did the programme behave as expected ie syntactically and logically correct?

No

Did not call an error for when there is a negative value entered.

Test: a) 53444 seconds

Screenshot(s) of output:

```
Please enter the latest lap times (in seconds....)
Lap 1: 53444
Lap 2: 53444
Lap 3: 53444
Lap 4: 53444
Lap 5: 53444

What is the world record attempt? 283.13
What is the olympic record attempt? 285.15

Here is the Winner's statistics:
1. Overall time was: 267220.000 seconds.
2. Average time was: 53444.000 seconds.
3. Fastest time was: 53444.000 seconds.
4. Fastest time was: 53444.000 seconds.
You were +266934.844 seconds slower than the Olympic record.

You were +266936.875 seconds slower than the World record.

Please now enter the 2nd place finisher's lap times:
Lap 1: |
```

Result: Did the programme behave as expected ie syntactically and logically correct?

YES

Provided correct overall, average, fastest and slowest times. Additionally provided correct relative time between Olympic and World record.

Although, there is a spelling error. Should be World not Olympic for second relative.

Test: b) Using the same five lap times for the winning athlete/2nd placed athlete as the sample output shown on the Worksheet:

Screenshot(s) of output:

```
Please enter the latest lap times (in seconds....)
Lap 1: 56.8
Lap 2: 57.2
Lap 3: 56.9
Lap 4: 56.8
Lap 5: 56.3

What is the world record attempt? 283.13
What is the olympic record attempt? 285.15

Here is the Winner's statistics:
1. Overall time was: 284.000 seconds.
2. Average time was: 56.800 seconds.
3. Fastest time was: 56.300 seconds.
4. Fastest time was: 57.200 seconds.

A new Olympic record!
You were -1.150 seconds faster than the Olympic record!
You were +0.870 seconds slower than the World record.

Please now enter the 2nd place finisher's lap times:
Lap 1: 56.7
Lap 2: 57.4
Lap 3: 56.8
Lap 4: 57.1
Lap 5: 57.5

Lap 1 was +0.100 seconds slower than the 2nd place.
Lap 2 was -0.200 seconds faster than the 2nd place.
Lap 3 was +0.100 seconds slower than the 2nd place.
Lap 4 was -0.300 seconds faster than the 2nd place.
Lap 5 was -1.200 seconds faster than the 2nd place.
C:\Users\Jake\Desktop\University Year 1\Software Development
code 0 (0x0).
Press any key to close this window . . .
```

Result: Did the programme behave as expected ie syntactically and logically correct?

YES

Provided correct overall, average, fastest and slowest times. Additionally provided correct relative time between Olympic and World record.

Test: c) Test two further sets of lap times of your own choice.

Screenshot(s) of output:

```
Please enter the latest lap times (in seconds....)
Lap 1: 56.1
Lap 2: 56.4
Lap 3: 56.7
Lap 4: 56.9
Lap 5: 57.2

What is the world record attempt? 283.13
What is the olympic record attempt? 285.15

Here is the Winner's statistics:
1. Overall time was: 283.300 seconds.
2. Average time was: 56.660 seconds.
3. Fastest time was: 56.100 seconds.
4. Fastest time was: 57.200 seconds.

A new Olympic record!
You were -1.850 seconds faster than the Olympic record!

You were +0.170 seconds slower than the World record.

Please now enter the 2nd place finisher's lap times:
Lap 1: 57.4
Lap 2: 57.6
Lap 3: 57.8
Lap 4: 56.9
Lap 5: 57.5

Lap 1 was -1.300 seconds faster than the 2nd place.
Lap 2 was -1.200 seconds faster than the 2nd place.
Lap 3 was -1.100 seconds faster than the 2nd place.
Lap 4 was -0.000 seconds faster than the 2nd place.
Lap 5 was -0.300 seconds faster than the 2nd place.
C:\Users\Jake\Desktop\University Year 1\Software Develop
code 0 (0x0).
Press any key to close this window . . .
```

Result: Did the programme behave as expected ie syntactically and logically correct?

YES

Provided correct overall, average, fastest and slowest times. Additionally provided correct relative time between Olympic and World record.

Test: d) Check that the 2nd placed competitor's times are reasonable (ie the overall time should not be faster than the winning athlete's)

Screenshot(s) of output:

```
Please enter the latest lap times (in seconds....)
Lap 1: 56.1
Lap 2: 56.4
Lap 3: 56.7
Lap 4: 56.9
Lap 5: 57.2

What is the world record attempt? 283.13
What is the olympic record attempt? 285.15

Here is the Winner's statistics:
1. Overall time was: 283.300 seconds.
2. Average time was: 56.660 seconds.
3. Fastest time was: 56.100 seconds.
4. Fastest time was: 57.200 seconds.

A new Olympic record!
You were -1.850 seconds faster than the Olympic record!

You were +0.170 seconds slower than the World record.

Please now enter the 2nd place finisher's lap times:
Lap 1: 57.4
Lap 2: 57.6
Lap 3: 57.8
Lap 4: 56.9
Lap 5: 57.5

Lap 1 was -1.300 seconds faster than the 2nd place.
Lap 2 was -1.200 seconds faster than the 2nd place.
Lap 3 was -1.100 seconds faster than the 2nd place.
Lap 4 was -0.000 seconds faster than the 2nd place.
Lap 5 was -0.300 seconds faster than the 2nd place.
C:\Users\Jake\Desktop\University Year 1\Software Develop
code 0 (0x0).
Press any key to close this window . . .
```

Result: Did the programme behave as expected ie syntactically and logically correct?

YES

Overall time for the 2nd competitor is greater utilising this set of results. On average, the 1st competitor is faster meaning the overall time will be less for the 1st competitor.

3. Consider the results of the above tests and revisit your original code in order to address any tests that failed and/or improve code efficiency.

(Note: you may not be able to solve all of the problems that were encountered, but solve as many as you can.)

Paste your full revised code here :

[Copy and paste your full revised code here – note, do not use a screenshot]

```
#define _CRT_SECURE_NO_WARNINGS
#include <stdio.h>
#include <math.h>

void main()
{
    float winAthlete[5];
    float sndAthlete[5];
    float worldRecord, olympicRecord, overallLap{}, averageLap{}, fastestLap, slowestLap{},
time{};

    printf("Please enter the latest lap times (in seconds....)\n");
    for (int i = 0; i < (sizeof(winAthlete) / sizeof(winAthlete[0])); i++)
    {
        printf("Lap %d: ", i + 1);
        scanf("%f", &winAthlete[i]);
    }
    printf("\nWhat is the world record attempt? ");
    scanf("%f", &worldRecord);
    printf("What is the olympic record attempt? ");
    scanf("%f", &olympicRecord);

    fastestLap = winAthlete[0];

    for (int i = 0; i < (sizeof(winAthlete)/sizeof(winAthlete[0])); i++)
    {
        overallLap = overallLap + winAthlete[i];
        averageLap = overallLap / 5;
        if (fastestLap > winAthlete[i])
        {
            fastestLap = winAthlete[i];
        }
        if (slowestLap < winAthlete[i])
        {
            slowestLap = winAthlete[i];
        }
    }

    printf("\nHere is the Winner's statistics: \n");
    printf("1. Overall time was: %.3f seconds.", overallLap);
    printf("2. Average time was: %.3f seconds.", averageLap);
```

```

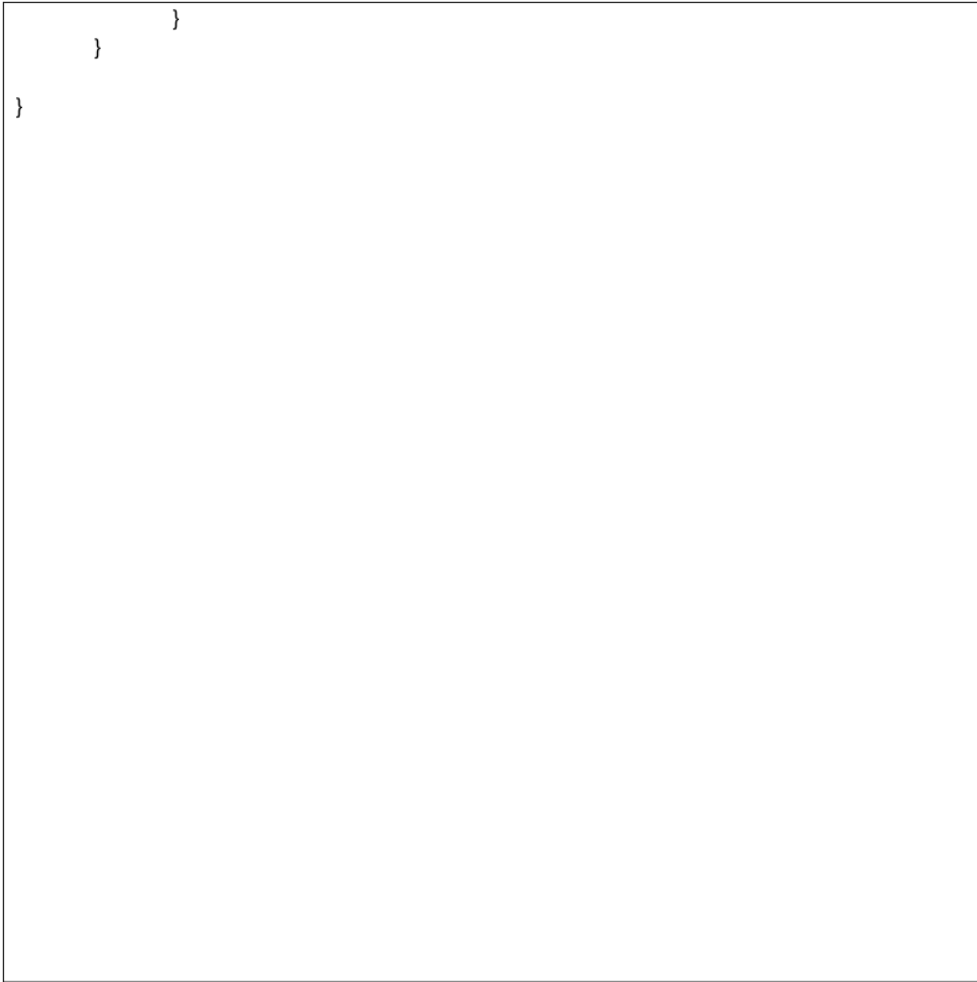
printf("\n3. Fastest time was: %.3f seconds.", fastestLap);
printf("\n4. Fastest time was: %.3f seconds.", slowestLap);

// Check if the overall lap was slower or faster than the Olympic Record.
if (olympicRecord > overallLap)
{
    olympicRecord = olympicRecord - overallLap;
    printf("\n\nA new Olympic record!");
    printf("\n\nYou were -%.3f seconds faster than the Olympic record!",
olympicRecord);
}
else
{
    olympicRecord = overallLap - olympicRecord;
    printf("\n\nYou were +%.3f seconds slower than the Olympic record.",
olympicRecord);
}
// Check if the overall lap was slower or faster than the World Record.
if (worldRecord > overallLap)
{
    worldRecord = worldRecord - overallLap;
    printf("\n\nA new World record!");
    printf("\n\nYou were -%.3f seconds faster than the World record!",
olympicRecord);
}
else
{
    worldRecord = overallLap - worldRecord;
    printf("\n\nYou were +%.3f seconds slower than the World record.",
worldRecord);
}

printf("\n\nPlease now enter the 2nd place finisher's lap times:\n");
for (int i = 0; i < (sizeof(sndAthlete) / sizeof(sndAthlete[0])); i++)
{
    printf("Lap %d: ", i+1);
    scanf("%f", &sndAthlete[i]);
}

for (int i = 0; i < (sizeof(sndAthlete) / sizeof(sndAthlete[0])); i++)
{
    if (winAthlete[i] > sndAthlete[i])
    {
        time = winAthlete[i] - sndAthlete[i];
        printf("\nLap %d was +%.3f seconds slower than the 2nd place.",
i+1,time);
    }
    else
    {
        time = sndAthlete[i] - winAthlete[i];
        printf("\nLap %d was -%.3f seconds faster than the 2nd place.", i+1, time);
    }
}

```



Worksheet 3 - Jake Richards

GRADEMARK REPORT

FINAL GRADE

13/0

GENERAL COMMENTS

WORKSHEET 3

Coding- The lap times need validating - I was able to enter 1 second for one of my laps which is beyond human possibility! Similarly I was able to enter very large lap times. Similarly, the world record , olympic record and second placed runner times need validating.

Overall though, you've got the core features working.

7/10

Testing - I'm a bit confused with your discussion. For example, the first test only asked about 56.7 seconds rather than the rest of the program. Also, 5 is not logically correct. You have identified that -4 is logically incorrect, but don't seem to have fixed this in the final code. 53444 is logically too high for an elite sporting event and would allow an inadvertent mistake/typo on behalf of the data entry person.

6/10

Overall- 13/20

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