

CSC 209 mid-term test

14 June 2022, 18:10

Name (underline surname):

Login name or student number:

Aids permitted: Any paper. **Calculators are not permitted.**

Total: 25 marks in five questions.

Time allotted: 45 minutes.

Since time is short, be careful not to get stuck on one question to the exclusion of others. Not everyone will necessarily be able to finish this test within the 45 minutes.

The amount of marks or answer-space allotted does not indicate how long it will take you to complete the question, nor does the size of the answer-space indicate the size of the correct answer.

Answer *all* questions. Answer questions in the space provided.

Be sure to write backquotes and single-quotes correctly and distinctly. We can only grade what you wrote, not what you meant.

- A single-quote looks like this: ' or this: ´
- A backquote looks like this: `

Do not open this booklet until you are instructed to.

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1. [3 marks]

Write an 'echo' command which produces the following output:

I'm *so* happy to be "here"!

with all punctuation appearing on the output exactly as shown — single quote (apostrophe), asterisks, double-quotes.

DO NOT WRITE ANYTHING IN THIS AREA

2. [5 marks]

Write a complete C program which processes data from its standard input to its standard output, swapping the characters 'x' and 'y' — any 'x' becomes 'y' and any 'y' becomes 'x', just like a "tr xy yx". For example, "syntax" would turn into "sxntay". All other characters are copied from stdin to stdout untransformed (including newlines, for example).

(This program does not declare the argc and argv parameters to main().)

```
#include <stdio.h>
```

3. [7 marks]

What is the complete output from each of these sets of shell commands?
(Please write your answers to the right.)

a)

```
x=34
echo x
expr $x + 3
```

b)

```
for i in `seq 5 8`
do
    echo $i
done
```

c)

```
for i in seq 5 8
do
    echo $i
done
```

DO NOT WRITE ANYTHING IN THIS AREA

4. [5 marks]

Write a function in C (not a complete program) which takes two parameters: an array of ints, and the size of that array. Your function will find the maximum distance between any two adjacent elements (as in a shell programming problem in assignment one) and return this integer. (Unlike the shell programming problem in assignment one, it does not keep track of *which* two elements had this maximum distance.)

If the array contains only zero or one items, return -1.

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5. [5 marks]

The following declarations are in place:

```
int i;  
int *p;  
int x[100];
```

Furthermore, `i` has been assigned to be 3; and `p` has been assigned to point to `x[2]`.

For each of these assignment statements, write a possible declaration for the variable on the left side of the equals sign which would make this assignment statement valid.

Example:

Question: `a = 12;`

Possible answer: `int a;`

Questions for you:

`b = '@';`

`c = &i;`

`d = p;`

`e = &p;`

`f = p + i;`

`g = x[i];`

`h[100] = &p;` (write a declaration for `h`)