

# Sample CS 142 Midterm Examination

Spring Quarter 2016

You have 1.5 hours (90 minutes) for this examination; the number of points for each question indicates roughly how many minutes you should spend on that question. Make sure you print your name and sign the Honor Code below. During the examination you may consult two double-sided pages of notes; all other sources of information, including laptops, cell phones, etc. are prohibited.

I acknowledge and accept the Stanford University Honor Code. I have neither given nor received aid in answering the questions on this examination.

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(Signature)

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(Print your name, legibly!)

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(Stanford email account for grading database key)

Problem	#1	#2	#3	#4	#5	#6	#7	#8	#9	Total
Score										
Max	10	11	12	12	9	12	8	10	6	90

## Problem #1 (10 points)

Consider the following JavaScript program. Each console.log call has a comment with blank slot after. In each slot write what the console.log would print out if you were to run this program.

```
console.log(a);           // log1 _____
var a = 3;
function foo(x) {
  console.log(x);         // log2 _____
  var c = 10;
  x = 20;
  console.log(a);         // log3 _____
  a = 4;
  return func;
  function func (d) {
    c = d;
    x *= 2;
    return { a: a, c: c, x: x };
  }
}
console.log(a);           // log4 _____
var bar = foo(a);

console.log(a);           // log5 _____
var retVal = bar(3);

console.log(retVal.a);     // log6 _____

retVal = bar(5);
console.log(retVal.c);     // log7 _____

console.log(retVal.x);     // log8 _____

console.log(a);           // log9 _____

console.log(retVal.func);  // log10 _____
```

## Problem #2 (11 points)

(A)

The following JavaScript program creates two objects named "obj" and "proto" and sets the prototype of obj to be proto. For each of the console.log statements in the program, write the three numbers (or the word undefined if the value printed would be undefined) in the provided slots on the side.

```
var proto = {a: 1, b: 2, c: 3};
```

```
var obj = {a: 0};
```

```
obj.__proto__ = proto;    // This sets the object's prototype to be the proto
```

```
console.log(obj.a, obj.b, obj.c);    // log1      _____, _____, _
```

```
-
```

```
proto.a = 5;
```

```
proto.b = 6;
```

```
proto.c = 7;
```

```
console.log(obj.a, obj.b, obj.c);    // log2      _____, _____, _
```

```
-
```

```
obj.a = 9;
```

```
obj.b = 8;
```

```
console.log(proto.a, proto.b, proto.c);    // log3  _____, _____, _
```

```
-
```

```
console.log(obj.a, obj.b, obj.c);    // log4      _____, _____, _
```

```
-
```

(B)

What is the difference between adding a method to a class via the prototype pattern versus assigning the method to the constructed object in the object's constructor?

### Problem #3 (12 points)

(A)

Given an HTML page with a button element, with id of "button" and the following JavaScript:

```
console.log("A");

setTimeout( function() {
    console.log("B");
}, 1000);

console.log("C");

setTimeout( function() {
    console.log("D");
}, 1500);

document.getElementById("button").onclick = function() {
    console.log("E");
    console.log("F");
}
```

Assuming the JavaScript is executed when the window is loaded, and a user clicks on the element with id "button" at some point, circle the following console outputs which are **possible** (there may be more than one).

A	A	A	A	A
B	C	C	C	C
C	B	B	E	E
D	E	E	B	F
E	F	D	F	B
F	D	F	D	D

(B)

If you had both a capture phase listener and a bubble phase listener for a click event on a DOM element, which would expect to run first if you clicked on the element? Briefly justify your answer.

How about if you click on a child element of the element with the listener registered? Briefly justify your answer.

## Problem #4 (12 points)

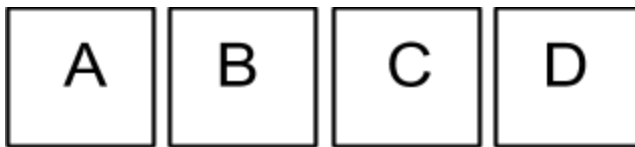
You are given an HTML page with four square `<div>` elements of class "box" that causes the browser to place blocks across a row as shown below in the "Initial box layout". For each of the additional CSS rules, please write the ID of the div in the box where it appears.

**Note:** If top/bottom/left/right are not defined, the values default to auto, which is calculated by the browser. inline-block elements are like inline elements but they can have a width and a height, allowing us to render our boxes horizontally.

### HTML

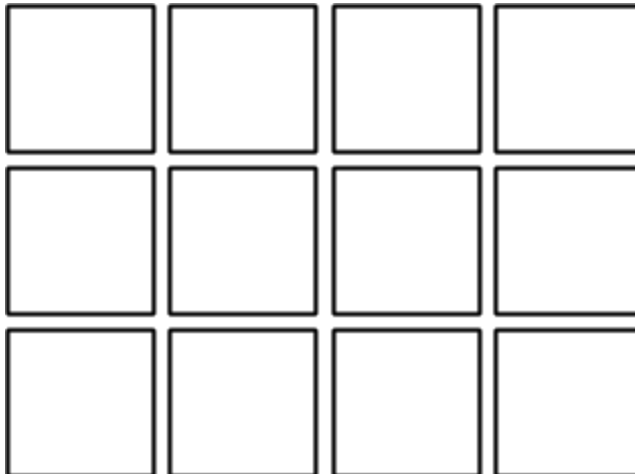
```
<div id="A" class="box">A</div>
<div id="B" class="box">B</div>
<div id="C" class="box">C</div>
<div id="D" class="box">D</div>
```

Initial box layout:



```
.box {
  height: 100px;
  width: 100px;
  display: inline-block;
  border: 2px solid black;
}
```

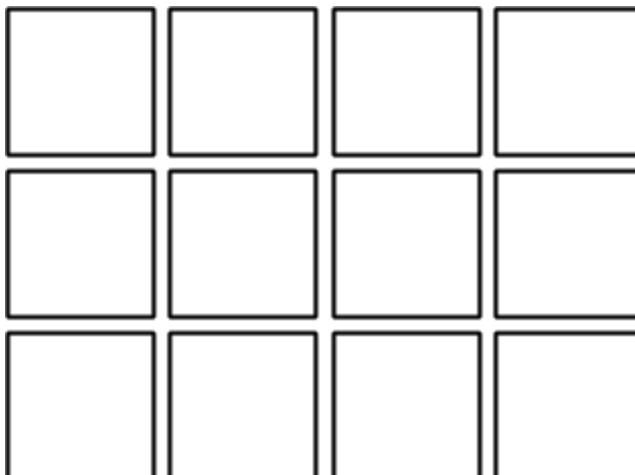
A)



### CSS

```
#A { position: relative;
      top: 0px; }
#B { position: relative;
      top: 0px; }
#C { position: relative;
      top: 0px; }
#D { position: absolute;
      top: 100px; }
```

B)



### CSS

```
#A { position: absolute;
      top: 100px; }
#B { position: relative;
      top: 0px; }
#C { position: relative;
      top: 0px; }
#D { position: relative;
      top: 100px; }
```

~~Problem #5 (9 points)~~

(A) Angular claims to support two-way binding. What does two-way binding mean?

(B) What mechanisms does Angular use to achieve two-way binding?

(C) Describe what would happen to an Angular Web Application if you deleted the ng-app attribute from the main view template. What would be displayed on the screen?

## Problem #6 (12 points)

(A) @media queries allow CSS selectors to be based on device size. Given the large number of different device sizes, how do modern frameworks use media queries to make sure their layouts look appropriate across all device sizes?

(B) Given the flexibility of CSS selectors, it is easy to write two rules that contain different selectors yet both end up matching a particular DOM element. For example, a selector might match on just the element (e.g. "p") or the element and a class (e.g. "p.class1"). What does CSS do if a stylesheet has two different rules with different selectors like these that match a single DOM element?

(C) Explain the difference between `display: block` and `display: inline`.

(D) When specifying `position: relative`, what is the element relative to?

### Problem #7 (8 points)

(A) How are invalid characters such as spaces used in query parameters?

(B) Label the parts (query parameters, server's port number, hierarchical portion, host name, scheme, and fragment) of the following URL along with a short(1-2 sentence) description of that part.

`file://host.cs142.com:50/animal/bird/penguin.html?user=Mendel#h3`



## Problem #8 (10 points)

(A) Describe what is meant by web applications that:

(1) Support deep-linking?

(2) Are responsive?

(B) Describe a way of building web applications supporting languages of different countries that doesn't require multiple view templates for the same view.

### Problem #9 (6 points)

(A) Explain why `<b>` and `<i>` are considered not good practice in HTML.

(B) List three things that can go in an HTML `<head>` section.