Exam 1

CS 0007 Computer Organization  
Summer 2020 (2207), MoWe 12:30 – 14:15

(out of 100 points)

Directions: This exam is closed book. You may not use any type of calculator (it is not needed). Put all materials under your desk, including cell/smart phones, smart watches, headphones, calculators, laptops, tablets, etc. All questions are marked with their point value. There should be plenty of workspace provided in the exam booklet, but if you need extra pages, you may use blank pieces of paper.

Show work: Be sure to show all work and turn in any extra pages that you use. If you do not show your work, you may not receive full or partial credit for a correct or wrong answer. Write legibly. If your handwriting cannot be read, then you will not receive credit for an answer.

|  |  |
| --- | --- |
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| Name |  |

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1. What software tool converts a program written in **Java language into Java Bytecode**? Fill-in the correct answer:

|  |  |
| --- | --- |
| * Converter * Assembler | * Interpreter * Compiler |

1. From the listed options, which is the last operation to execute in a **Java language expression**? Fill-in the correct answer:

|  |  |
| --- | --- |
| * = * - | * == * \* |

1. Which number fits in a **Java** byte variable? Fill-in the correct answer:

|  |  |
| --- | --- |
| * -100 * 1000 | * 300 * -900 |

1. Which option better reflects the type of the following literal **‘A’**? Fill-in the correct answer:

|  |  |
| --- | --- |
| * double * char | * int * String |

1. Which option better reflects the type of the following literal ‘A’? Fill-in the correct answer:

|  |  |
| --- | --- |
| * double * char | * int * String |

1. Which of the following components is part of the CPU

|  |  |
| --- | --- |
| * ALU * Memory | * HDD * Keyboard |

1. In each rectangle, write **T** or **F** to indicate whether the statement is true or false.

|  |  |
| --- | --- |
| T | You need to compile Java code. |
|  |  |
| F | A Java program can solve ALL problems. |
|  |  |
| T | Java is a typed language |
|  |  |
| F | This code prints “TRUE” only if number is larger than zero if(number>0);  {  System.out.println(“TRUE”); } |
|  |
| F -> ==    -> ; | The following code has no errors if(a=2) {  a+=2; } else {  a++ } |

1. Consider the following variables and answer the questions:  
   int x = 3;  
   int y = 2;  
   1. What is the output of the following expression?  
      **System.out.print(x/2);**

|  |
| --- |
| **Write your final answer in the box below:** |
| 1 |

* 1. What is the output of the following expression?  
     **System.out.print(x/2.0);**

|  |
| --- |
| **Write your final answer in the box below:** |
| 1.5 |

* 1. What is the output of the following expression?  
     **System.out.print( x+y );**

|  |
| --- |
| **Write your final answer in the box below:** |
| 5 |

* 1. What is the output of the following expression?  
     **System.out.print(“x+y = “ + x+y );**

|  |
| --- |
| **Write your final answer in the box below:** |
| x+y=32 |

* 1. What is the output of the following expression?  
     **System.out.print(“x+y = “ + (x+y) );**

|  |
| --- |
| **Write your final answer in the box below:** |
| x+y=5 |

* 1. What is the output of the following expression?  
     **System.out.print(“x<y? “ + (x<y) );**

|  |
| --- |
| **Write your final answer in the box below:** |
| X<y? false |

1. For each of the following expressions, tell if they are true or false  
   Assume:  
   **boolean t = true;  
   boolean f = false;  
   int i = 10;  
   int j = -100;  
     
   t || (i<10) || ( f && !f && i>j) \_\_true\_**

**f || (i<10) || (!f && j>0) \_false\_**

**t || f \_true\_\_**

**i>j && t \_true\_\_**

1. Fill in the appropriate variable type.

**short s = 2;  
byte b = 1;  
int i = 12;  
long l = 123;  
double d = 1.3;  
\_int\_\_\_\_ number1 = s+b;  
\_int\_\_\_\_ number2 = i\*s;  
\_long\_\_\_ numberX = i\*l;  
\_double\_ number3 = s\*d;  
\_int\_\_\_\_ number4 = i\*i;  
\_double\_ number5 = d+b\*s;**

1. What is the value of variable s?  
   **String s = “HeLLo”;  
   s.toLowerCase();** **System.out.println(s);**

|  |
| --- |
| **Write your final answer in the box below:** |
| HeLLo |

1. Read the following code. It shows function addOneToMult4 that should return n+1 if n is a multiple of 4, and return n otherwise. Mistakes may have been made, can you find any?

**[] public static int addOneToMult4(double n) {  
[] if(n % 4 = 0);  
[] {  
[] return n+1;  
[] }  
[] return n;  
[]}**

1. Are the following examples equivalent? (tricky, tricky) **Nope**

**int i=0;  
while(i<10)**

**{  
 i++;  
 System.out.print(i);  
}**

**for(int i=1; i<=9; i++)  
{  
 System.out.print(i);  
}**

1. What is the output of **System.out.println(mystery0(-1));**

|  |
| --- |
| **public static int mystery0(int x)**  **{**  **while(x < 10)**  **{**  **if(x <= 0)**  **{**  **x = mystery1(x);**  **}**  **else**  **{**  **x = mystery2(x+1);**  **}**  **System.out.println(x);**  **}**  **return x;**  **}**  **public static int mystery1(int x)**  **{**  **return -2\*x;**  **}**  **public static int mystery2(int x)**  **{**  **return -x;**  **}** |
| Output:  2  -3  6  -7  14  14 |

1. The following code segment compiles and runs correctly:

**int i = 7;**

**boolean b=false;**

**if (i>0)**

**{**

**b = (i % 2) != 0;**

**i = i % 2;**

**}**

**else**

**{**

**i = 1 + (i%2);**

**b = true;**

**}**

**if (i%2 ==0 )**

**{**

**if (i>=0)**

**{**

**i = -7;**

**b = false;**

**}**

**}**

**else**

**{**

**if (b)**

**{**

**i = (i%5) - 9;**

**}**

**else**

**{**

**b = (i%2) != 0 ;**

**}**

**}**

The final value of b is: \_\_\_**true**\_\_\_

The final value of i is: \_\_\_\_**-8**\_\_\_\_

1. What is the output of the following code?

**public static int calc (int x)  
{  
 return x++;  
}  
public static void main (String[] args)  
{  
 int x = 2;  
 calc(x);  
 System.out.println( x );  
}**

**Output:  
2**

1. What is the output of the following code?

**for (int i=0 ; i<5 ; i++ )**

**{**

**for (int j=1 ; j<i ; j++ )**

**{**

**System.out.print( i%j + " " );**

**}**

**System.out.println();**

**}**

**Output:  
0  
0 1  
0 0 1**

1. What is the output of the following code?

**public static void main (String[] args)  
{  
 int a = 1;  
 int b = 2;  
 int c = 10;  
  
 function(a);  
 function(b);  
 function(c);  
  
 changeA(a);  
 b = changeB(b);  
  
 function(a);  
 function(b);  
}  
public static void function(int number)  
{  
 System.out.println(number);  
}  
public static void changeA(int a)  
{  
 a+=1;  
}  
public static int changeB(int b)  
{  
 b+=1;  
 return b;  
}**

Output:

1

2

10

1

3

1. What is the output of the following code?

**public static void main (String[] args)  
{  
 int[] a = {1, 2, 10};  
  
 function(a[0]);  
 function(a[1]);  
 function(a[2]);  
  
 change1(a);  
 a = change2(a);  
  
 function(a[1]);  
 function(a[2]);  
}  
public static void function(int number)  
{  
 System.out.println(number);  
}  
public static void change1(int[] a)  
{  
 a[1]+=1;  
}  
public static int[] change2(int[] a)  
{  
 a[2]+=1;  
 return a;  
}**

Output:

1

2

10

3

11

1. What is the output of the following code?

**public static void main (String[] args)  
{  
 int[] array1 = {1, 2, 10, 20, 100, 200};  
 int[] array2 = {0, 0, 0, 0, 0, 0};**

**int read = 0;  
 int write = array2.length - 1;  
 while ( read < array1.length )  
 {  
 array2[write] = array1[read];  
 write--;  
 read++;  
 }  
  
 for (int i = 0; i< array2.length; i++)   
 {  
 System.out.print( array2[i] + “ “);  
 }  
}**

**200 100 20 10 2 1**

1. What is the output of the following code?

**public static void main (String[] args)  
{  
 int[] array = {1, 2, 10, 20, 100, 200};**

**int front = 0;  
 int back = array.length - 1;  
 while ( front < back )  
 {  
 System.out.println( array[front] + “ “ + array[back]);  
 front++;  
 back--;  
 }  
}**

Output:

1 200

2 100

10 20

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