Note: Correct responses are based on Java, J2sdk v 7.0, from Sun Microsystems, Inc. All provided code segments are intended to be syntactically correct, unless otherwise stated (i. e. `error` is an answer choice) and any necessary Java 2 Standard Packages have been imported. Ignore any typographical errors and assume any undefined variables are defined as used.

QUESTION 1

What is 41_{16} minus 1001_2 ?

A. 56_{10} B. -960_{10} C. 111100_2 D. -15_{10} E. 37_{16}

QUESTION 2

What is output by the code to the right?

A. 47 B. 16 C. 15 D. 48 E. 44

```
int k = 0b101111;
k = ++k/3;
out.println(k);
```

QUESTION 3

What is output by the code to the right?

A. ++--*+--

B. +--++

C. -+++

D. ++--*+--+-+++

E. ++--*+--++--++

```
String str = "++--*+--+";
for(int i=0; i<str.length(); i+=3)
  str+=str.charAt(i);
out.println(str);
```

QUESTION 4

What is output by the code to the right?

A. All he Prey Horses___

B. All the Pretty Horses

C. All he Prey Horses

D. All t_he Pret_t_y Horses

E. All _he Pre__y Horses

```
String str;
str="All the Pretty Horses";
str=str.replace("t","_");
System.out.println(str);
```

QUESTION 5

What is output by the code to the right?

A. 9 8 10 13 6 5 9

B. 2 9 1 10 4 6 3 9

C. 2 7 1 9 4 2 3 6

D. 9 7 10 9 6 2 9 6

E. There is no output due to a runtime error.

```
int[] list = {2,7,1,9,4,2,3,6};
int sum = 100;
for(int i=1; i<list.length; i+=2)
  list[i-1]+=list[i];
for(int x:list)
  out.print(x+" ");
```

QUESTION 6

What is output by the code to the right?

A. 14.344

B. 7.3926

C. 8.4724

D. 5.4129

E. 1.1713

```
double x = 29.3;
x /= Math.sqrt( x );
out.printf( "%.4f", x );
```

QUESTION 7

In order for a player to get the special armor, that player must have not killed the king and either have won a joust or saved the princess. The player could also get the armor by having killed the king and lost the joust and saved the princess. Assuming each variable is a boolean, which line of code gives the best solution?

A. `savePrin || !kingDead && winJoust`

B. `kingDead && winJoust || kingDead && savePrin || !kingDead && !winJoust && savePrin`

C. `!kingDead && (winJoust || savePrin || winJoust && savePrin)`

D. `!kingDead && (winJoust || savePrin) || (kingDead && !winJoust && savePrin)`

E. `kingDead && (!winJoust || !savePrin)`

QUESTION 8

What is output by the code to the right?

A. `Wine`

B. `Yogurt`

C. `Strawberry`

D. `Fields`

E. `Shortcake`

```
String x = "Strawberry";
switch(x.length()%7)
{
   case 2: x = "Fields"; break;
   case 5: x = "Shortcake"; break;
   case 3: x = "Wine"; break;
   case 1: x = "Yogurt"; break;
}
out.println(x);
```

QUESTION 9

Which of the following correctly replaces **<*1>** in the code to the right?

A. `new TimeTraveler();`

B. `new TimeTraveler(kb.nextLine());`

C. `kb.nextLine();`

D. `TimeTraveler("Smith");`

E. `addTraveler(kb.nextLine());`

QUESTION 10

Assuming that **<*1>** has been filled correctly, what is the output by **//line 1** in the code to the right?

A. `13`

B. `1`

C. `12`

D. `11`

E. `0`

```
class TimeTraveler
{
  private String doctor;
  private static int regen = 0;

  public TimeTraveler(String name)
  {
     doctor = name;
  }

  public void addTraveler(String name)
  {
     doctor = name;
     regen++;
  }

  public int getRegens()
  {
     return regen;
  }
}

////////////////////////////////////
//////////CLIENT CODE///////////////
Scanner kb = new Scanner(System.in);

TimeTraveler who = <*1>

for(int i=0; i<12; i++)
  who = <*1>
out.println(who.getRegens()); //line 1
```

QUESTION 11

What is output by the code to the right?

A. 607 B. 303 C. 810 D. 608 E. 304

```
out.println( 2431 >> 3 );
```

QUESTION 12

Which line of code creates a random number between 16 and 30 inclusively?

A. `int x = (int)(Math.random() * 14 + 16);`

B. `int x = (int)(Math.random() * 13 + 16);`

C. `int x = (int)(Math.random() * 15 + 16);`

D. `int x = (int)(Math.random() * 16 + 13);`

E. `int x = (int)(Math.random() * 14 + 17);`

QUESTION 13

How many `t`'s are printed out by the code to the right?

A. 45

B. 30

C. 15

D. 60

E. 20

```
for(int i=0; i<10; i++)
{
  for(int j=i; j<5; j++)
     out.print("t\tt");
  out.println();
}
```

QUESTION 14

How many spaces are printed by the code to the right?

A. 19 B. 18 C. 21

D. 20 E. 22

```
double x = 1.25874;
String st = "John";
String st2 = "Wayne";
out.printf("%20s%6.3f%10s\n",st,
                                x,st2);
```

QUESTION 15

The method to the right should calculate 1.5% of the size provided. This will be its tolerance level. Which of the following code would best replace **<*1>**?

A. `return size*0.015;`

B. `out.println(size*0.015);`

C. `size*=0.015;`

D. `return size+=size*0.015;`

E. `return size < size*0.015;`

```
public double tolerance(double size)
{
     <*1>
}
```

QUESTION 16

What is the output by the code to the right?

A. ttt ttt mttble

B. rum umum mumble

C. rrt trt mrtble

D. rum tum mumble

E. umumum umumum mumumble

```
String x = "rum tum mumble";
x.replace("um","rt");
x.replace("r","t");
out.println(x.replace("t","um"));
```

QUESTION 17

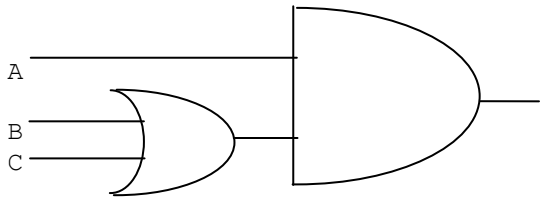
OPEN ENDED QUESTION – *Find the the output of the code to the right and write it on your answer sheet, or if using a ScanTron form, out to the side of the bubbles.*

NOTE – *This question is a new style UIL Computer Science question being considered for inclusion on new UIL Computer Science tests.*

```
int[][] mat = new int[5][5];
int x = 0;

for(int i=0; i<5; i++)
  for(int j=0; j<5; j++)
     mat[i][j] = x++;

for(int i=0; i<mat.length; i++)
  for(int j=0; j<mat.length-i; j++)
  {
     int r = mat.length-1-j;
     int c = mat.length-1-i;
     mat[r][c]=mat[i][j];
  }

out.println(mat[3][3]);
```

QUESTION 18

Which of the following logical statements is represented by the digital electronics diagram on the right ?



A. `A && !(B && C)`

B. `A || B && C`

C. `A && (B || C)`

D. `A || B || C`

E. `A && B && C`

QUESTION 19

What is the output by the code to the right?

```
ArrayList<Integer> list;
list = new ArrayList<Integer>();
list.add(25);
list.add(1);
list.add(1,10);
list.add(2,33);
list.add(0,43);
list.remove(list.size()/2);
list.set(3,5);
list.add(list.size(),13);
list.remove(4);
Collections.reverse(list);
list.remove(list.size()/2);
out.println(list);
```

A. `[5, 33, 25, 43]`

B. `[5, 33, 43]`

C. `[43, 25, 33, 5]`

D. `[43, 25, 5]`

E. There is no output due to a runtime error.

QUESTION 20

What is output by the code to the right?

```
String x = "topsy turvy";
String y = "";
for(int i=3; i<50; i+=9)
  y += x.charAt(i%x.length());
out.println(y);
```

A. `oyrtyp`

B. `soyrty`

C. `toopsy`

D. `tuu so`

E. There is no output due to a runtime error.

QUESTION 21

What does the array look like at the end of the code to the right?

A. `[37, 8, 16, 5, 31]`

B. `[37, 8, 16, 5, 26]`

C. `[5, 18, 26, 15, 36]`

D. `[0, 0, 0, 5, 36]`

E. There is an index out of bounds exception.

```
int[] x = {47,18,26,15,36};
int loc = 0;
while (x[loc]>5)
  x[loc++]-=5;
```

QUESTION 22

What is returned by the method call `fables(2,3);`

A. the empty string

B. `DEADNEUTRAL`

C. `DEADEVIL`

D. `ALIVEEVIL`

E. `ALIVEAPATHETIC`

QUESTION 23

Which method call will result in returning the String `ALIVEGOOD`?

A. `fables(2,1)`

B. `fables(1,2)`

C. `fables(1,1)`

D. `fables(3,4)`

E. `fables(2,2)`

```
public String fables(int dec2,
                     int dec1)
{
  String outcome = "";
  if (dec1 == 1)
  {
     outcome = "DEAD";
     if (dec2 == 1)
        outcome += "EVIL";
     else if(dec2 == 2)
        outcome += "GOOD";
     else if(dec2 == 3)
        outcome += "NEUTRAL";
  }
  else
  {
     outcome = "ALIVE";
     if (dec2 == 1)
        outcome += "GOOD";
     else if(dec2 == 2)
        outcome += "APATHETIC";
     else if(dec2 == 3)
        outcome += "EVIL";
  }
  return outcome;
}
```

QUESTION 24

Which of the following correctly replaces **<*1>** in the code to the right?

A. `Puppet pup = new Puppet(5,4);`

B. `Puppet pup = new SideScroll(5,4);`

C. `TopDown pup = new Puppet(5,4);`

D. `SideScroll pup = new TopDown(5,4);`

E. `SideScroll pup = new Puppet(5,4);`

QUESTION 25

Which of the following correctly replaces **<*2a>** and **<*2b>** in the code to the right?

	<*2a>	**<*2b>**
A.	`TopDown`	`((TopDown)pup)`
B.	`Puppet`	`pup`
C.	`SideScroll`	`pup`
D.	`SideScroll`	`((SideScroll)pup)`
E.	`TopDown`	`pup`

QUESTION 26

Assuming that all blanks have been filled correctly, what is output by the code to the right?

A. `4 7`

B. `3 6`

C. `7 3`

D. `4 5`

E. `6 3`

```
interface Puppet
{
  public void moveForward();
  public void moveBackward();
}

class TopDown implements Puppet
{
  private int x, y;

  public TopDown(int x, int y)
  {
     this.x = x;
     this.y = y;
  }
  public int getX(){ return x;}
  public int getY(){ return y;}
  public void setX(int x)
  {  this.x = x; }
  public void setY(int y)
  {  this.y = y; }
  public void moveForward()
  {  x++; y++;   }
  public void moveBackward()
  {  x--; y--;   }
  public String toString()
  {  return x+" "+y;  }
}

class SideScroll extends TopDown
{
  public SideScroll(int x, int y)
  {   super(x,y); }
  public void moveForward()
  {   setX(getX()+1); }
  public void moveBackward()
  {   setX(getX()-1); }
  public void moveUp()
  {   setY(getY()+1); }
  public void moveDown()
  {   setY(getY()-1); }
}

////////////////////////////
//////// CLIENT CODE ///////
<*1>
     if( pup instanceof <*2a>  )
  <*2b>.moveDown();
pup.moveForward();
out.println(pup);
```

QUESTION 27

What is `list` after **`//line 1`** in the code to the right is executed?

A. `[2, 18, 26, 48, 35, 47]`

B. `[48, 2, 18, 47, 26, 35]`

C. `[48, 2, 18, 26, 47, 35]`

D. `[2, 18, 26, 35, 47, 48]`

E. There is no output due to a compile time error.

QUESTION 28

What is `list` after **`//line 2`** in the code to the right is executed?

A. `[2, 18, 26, 35, 47, 48]`

B. `[35, 26, 2, 47, 18, 48]`

C. `[35, 26, 2, 47, 48, 18]`

D. `[48, 18, 47, 2, 26, 35]`

E. There is no output due to a compile time error.

```
public static void blah(
                  int[] list, int x)
{
  ArrayList<Integer>[] temp;
  temp = new ArrayList[x];
  for(int i = 0; i<temp.length; i++)
     temp[i] = new ArrayList<>();
  for(int z:list)
     temp[z%x].add(z);
  int k = 0;
  for(int i = 0; i<temp.length; i++)
     while(!temp[i].isEmpty())
        list[k++]=temp[i].remove(0);
}

////////////////////////////////
//CLIENT CODE///////////////////
int[] list = {48,2,18,47,26,35};
blah(list, 2); //line 1
blah(list, 5); //line 2
```

QUESTION 29

Which of the following will ensure that the recursive method to the right will end?

A. `y` alternately increases and decreases

B. `x` never becomes bigger than 2

C. `y` never becomes lesser than 0

D. the method is an infinitely recursing method

E. `x` increases three consecutive times

QUESTION 30

Assume the following values were generated by `Math.random()`:

0.75, 0.46, 0.27, 0.06, 0.89, 0.09, 0.71, 0.40, 0.31, 0.75, 0.28, 0.53

What is returned by the method call `mys(1,1)`?

A. `6` B. `2`

C. `5` D. `3`

E. the method is still recursing

```
public static int myst(int x, int y)
{
  if(x>2 || x<0)
     return 0;
  if(y>2 || y<0)
     return 0;
  if (Math.random()<0.5)
     x++;
  else
     x--;
  if (Math.random()<0.5)
     y++;
  else
     y--;
  return 1+myst(x,y);
}
```

QUESTION 31

How many bits are in an `int` data type?

A. 16 B. 8 C. 4 D. 32 E. 2

QUESTION 32

How many leaves would be in the binary search tree with built from the following list: 40, 15, 16, 11, 3, 46, 45, 42, 41, and 30.

A. 3 B. 8 C. 10 D. 5 E. 1

QUESTION 33

What is the output by **`//line 1`** in the code to the right?

A. `[]`

B. `[4, 6, 8, 10]`

C. `[4, 8, 4, 10, 6, 8, 8, 4, 4, 6]`

D. `[4, 8, 10, 6]`

E. `[4, 4, 4, 4, 6, 6, 8, 8, 8, 10]`

QUESTION 34

What is the output by **`//line 2`** in the code to the right?

A. `[2, 7, 4, 10, 8, 3, 6]`

B. `[7,2,4,7,10,8,2,3,10,3,4,8,4,10,6,8,8,4,4,6]`

C. `[2, 3, 4, 6, 7, 8, 10]`

D. `[2,2,3,3,4,4,4,4,4,6,6,7,7,8,8,8,8,10,10,10]`

E. `[]`

QUESTION 35

What is the output by **`//line 3`** in the code to the right?

A. `[7, 2, 3, 6]`

B. `[4, 8, 10]`

C. `[4, 10, 8]`

D. `[]`

E. `[2, 3, 6, 7]`

```
int[] list1 ={7,2,4,7,10,8,2,3,10,3};
int[] list2 = {4,8,4,10,6,8,8,4,4,6};
Set<Integer> a = new TreeSet<>();
Set<Integer> b = new TreeSet<>();
Set<Integer> c = new TreeSet<>();
for(int x: list1)
  a.add(x);
for(int x: list2)
  b.add(x);
out.println(b);  //line 1
c.addAll(a);
c.addAll(b);
out.println(c);  //line 2
a.retainAll(b);
out.println(a);  //line 3
```

QUESTION 36

What is the output by **`//line 1`** in the code to the right?

A. `5`

B. `10`

C. `9`

D. `2`

E. `8`

QUESTION 37

What is output by **`//line 2`** in the code to the right?

A. `[2, 8, 8, 4, 9, 9]`

B. `[9, 2, 4, 8, 8, 9]`

C. `[2, 8, 4, 8, 9, 9]`

D. `[9, 9, 2, 8, 4, 10]`

E. There is no output due to a run time error.

```
LinkedList<Integer> list;
list = new LinkedList<Integer>();
list.offerFirst(9);
list.offerFirst(9);
list.offer(5);
list.push(2);
list.offerLast(8);
list.add(10);
list.set(3,2);
out.println(list.pop()); // line 1
list.poll();
list.offerLast(list.peek());
list.add(list.remove());
ListIterator<Integer> iter;
iter = list.listIterator();
iter.next();
iter.next();
iter.next();
iter.remove();
iter.add(4);
iter.add(8);
out.println(list);          // line 2
```

QUESTION 38

What is output by the code to the right?

A. `a` B. `32` C. `65` D. `97` E. `P`

```
System.out.println('A'^'a');
```

QUESTION 39

What string `s` would cause the code to the right to return true?

A. `PPpht`

B. `It's a Puppy!`

C. `Pauper Paper`

D. `Puppy Wuppy`

E. `PpUpP`

```
s.matches("P.*p{2}.*")
```

QUESTION 40

What is output by the code to the right?

A. `3`

B. `16`

C. `14`

D. `17`

E. `13`

```
String x = "pppppppqppppppppqppp";
String[] list = x.split("p");
out.print(list.length);
```