Note: Correct responses are based on Java, **J2sdk v 1.7.25**, 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. **For all output statements, assume that the System class has been statically imported…** ***import static java.lang.System.*;***

QUESTION 1

What is 101101_2 plus $1E_{16}$?

A. 75_{10} B. $5A_{16}$ C. $4C_{16}$ D. 85_{10} E. 101011_2

QUESTION 2

What is output by the code to the right?

A. 2 B. 10 C. 12

D. 11 E. There is no output due to a run-time error

```
int x = 3, y = 6;
int z = x + y * y / x - x;
out.println(z);
```

QUESTION 3

What is output by the code to the right?

A.
```
1234567890
    453$urnbvysl
```

B.
```
1234567890
    453$urnbv
```

C.
```
1234567890
  453  $urnbv
```

D.
```
1234567890
  453  $urnbvysl
```

E.
```
1234567890
    num$list
```

```
String list = "urnbvysl";
int num = 453;
out.printf("1234567890\n%5d$%5s",num,
           list);
```

QUESTION 4

What is output by the code to the right?

A. `Get me to the church on time`

B. `Get you to the church on time`

C. `Get me to the church on tiyou`

D. `Get you to the church on tiyou`

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

```
String x;
x = "Get me to the church on time";
x.replace("me","you");
out.println(x);
```

QUESTION 5

What values for `a`, `b`, and `c` make the output to the right `false`?

A. only `b` must be false

B. either `a` and `b` or `b` and `c` must be false

C. `a`, `b`, and `c` must all be false

D. `b` must be true

E. `a` and `c` must be true

```
boolean a, b, c, d;
d = a || b && b || c;
out.println(d);
```

QUESTION 6

What is the range of the output by the code to the right?

A. `[-10,10)`

B. `[0,24)`

C. `[5,14)`

D. `[5,10)`

E. `[-10,14)`

```
int x = (int)(Math.random()*5+5);
int y = (int)(Math.random()*24-10);
out.println(Math.max(x,y));
```

QUESTION 7

What is output by the code to the right?

A. `2`

B. `4`

C. `3`

D. `19`

E. `5`

```
int a;
int x = 6;
int y = 10;
int z = 8;
a = x + y + z % 5;
out.println(a);
```

QUESTION 8

What is output by the code to the right?

A. `112`

B. `37`

C. `87`

D. `62`

E. `137`

```
int x = 37;
if(x<25)
    x+=25;
if(x<50)
    x+=25;
if(x<75)
    x+=25;
if(x<100)
    x+=25;
out.println(x);
```

QUESTION 9

What is output by the code to the right?

A. `KS AOOA S`

B. `KSCL ARYO`

C. `SKLCA YRO`

D. `YOL_KK_LO`

E. `SKA OO AS`

```
String s = "KC ROYALS";
char let;
int len = s.length();
for(int i=0; i<len; i++)
{
  if((i+5)%2==0)
    let=s.charAt((len-i)%s.length());
  else
    let=s.charAt((len+i)%s.length());
  out.print(let);
}
out.println();
```

QUESTION 10

What is output by the code to the right?

A. `4` B. `3` C. `0` D. `8`

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

```
int[] list = {2,3,8,1,4,0,3,2};
out.println(list[list[list[5]]]);
```

QUESTION 11

Which of the following correctly instantiates a Scanner object?

A. `Scanner input = new Scanner(System.out);`

B. `Scanner input = new String("Bobby");`

C. `Scanner input = System.in;`

D. `Scanner input = new Scanner("Bobby");`

E. `Scanner input = new Scanner();`

QUESTION 12

What is output by the code to the right?

A. `17`

B. `15`

C. `16`

D. `56`

E. `50`

```
int x = 1;
for(x = 2; x < 15; x+=2)
  x++;
out.println(x);
```

QUESTION 13

What is order of precedence for the operations on the right from highest precedent to lowest precedent?

A. I, II, III

B. II & III (same precedent), I

C. I, III, II

D. II, III, I

E. I, II & III (same precedent)

I. `x++`
II. `+` (additive)
III. `++x`

QUESTION 14

What is output by the code to the right?

A. `2147483647`

B. `65534`

C. `32767`

D. `4294967294`

E. `9223372036854775807`

```
out.println(Integer.MAX_VALUE);
```

QUESTION 15

What is output by the code to the right?

A. `[Pat, Mat, Sat, Cat]`

B. `[Pat, Mat, Cat, Fat]`

C. `[Pat, Sat, Cat, Fat]`

D. `[Fat, Mat, Cat, Pat]`

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

```
ArrayList<String> list =
     new ArrayList<>();
list.add("Pat");
list.add("Mat");
list.add("Sat");
list.add("Cat");
list.remove(2);
list.add(1,"Fat");
list.add(list.remove(0));
out.println(list);
```

QUESTION 16

Which of the following correctly places a modifier method at **<*1>** in the code to the right?

A. `fight += f;  }`

B. `public void add(int x){ fight += x; }`

C. `public add(int x){ fight += x; }`

D. `public GoTA(int x){ fight = x; }`

E. `public int add(int x){ fight += x;  }`

QUESTION 17

Which of the following correctly places an accessor method at **<*2>** in the code to the right?

A. `public int getMoney(){out.print(money);}`

B. `public int getMoney(int x){return x;}`

C. `public void getMoney(){return money;}`

D. `public void getMoney(int x){return money;}`

E. `public int getMoney(){return money;}`

```
class GoTA
{
  private int fight, money, spy;

  public GoTA(int f, int m, int s)
  {
          fight = f;
          money = m;
          spy = s;
  }

  // <*1> modifier method

  // <*2> accessor method
}
```

QUESTION 18

What is output by line **<*1>** in the code on the right?

A. 0

B. 2

C. 8

D. 4

E. 5

QUESTION 19

What is output by line **<*2>** in the code to the right?

A. 16

B. 20

C. 36

D. 24

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

```
int[][] mat = {{6,4,6,2},
               {8,2,7,4},
               {5,0,1,7},
               {4,2,2,9},
               {1,3,1,4}};

out.println(mat[2][1]); //<*1>
int k = 4;
int count = 0;
for(int i=0; i<mat.length; i++)
  for(int j=0; j<mat[1].length; j++)
  {
     count++;
     if(mat[i][j]==k)
        mat[i][j--]--;
  }

out.println(count);      //<*2>
```

QUESTION 20

What is output by the code to the right?

A. 10

B. 0

C. 28

D. 1

E. 20

```
int x = 17;
int y = 20;
int z = 47;
int a = y & z>>1 | x & y>>1;
out.println(a);
```

QUESTION 21

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

A. `r<3 && c<2`

B. `r==c && c>=2`

C. `r>=3 && c>=2`

D. `r>=3 || c>=2`

E. `r>=3 && c<2`

```
public static void mys1(int[][] mat)
{
  for(int r=0; r<mat.length; r++)
   for(int c=0; c<mat[r].length; c++)
    if(  //<*1>   )
      mat[r-3][c-2]+=mat[r][c];
    else
      mat[r][c]--;
}
```

QUESTION 22

What would be stored in `mat[0][0]` after a call to mys1 with the following matrix?

```
int mat[][] = {{1,3,3,3,5},
               {5,5,3,9,4},
               {4,7,2,2,4},
               {3,0,4,4,2},
               {9,1,0,3,4}};
```

A. `4`

B. `1`

C. `5`

D. `3`

E. `-1`

QUESTION 23

What can be discerned from the basic UML inheritance diagram to the right?

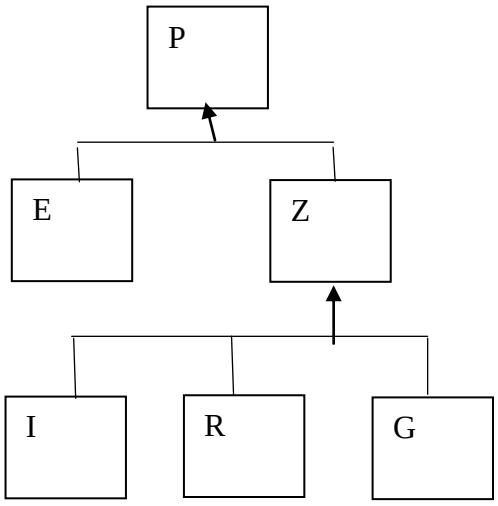
A. P is a Z

B. E is a I

C. I has a P

D. R is a P

E. more than one of these are correct



QUESTION 24

What is output by line **<*1>** in the code to the right?

A. 36

B. 50

C. 5

D. 45

E. 14

QUESTION 25

What is output by line **<*2>** in the code to the right?

A. 52
   52

B. 22
   44

C. 7
   22

D. 7
   52

E. 52
   22

QUESTION 26

What is output by line **<*3>** in the code to the right?

A. 163

B. 164

C. 61

D. 64

E. 169

```
class W
{
  private int x;
  public W(int k){x = k;}
  public void m(int k){x+=k;}
  public int get(){return x;}
  public void p(){out.println(x);}
}

class X extends W
{
  private int x;
  public X(int k){
     super(5);
     x = k;
  }
}

class Y extends W
{
  private int x;
  public Y(int k){
     super(7);
     x = 2*k;
  }
  public void m(int k, int j){
     x+=k-j;
  }
  public void p(){
     super.p();
     out.println(x);
  }
}

////////////////////////////////////
///////CLIENT CODE/////////////////
X t = new X(36);
t.m(9);
t.p();    //<*1>
Y k = new Y(22);
k.m(19,11);
k.p();     //<*2>
W[] list = new W[5];
list[0] = new W(37);
list[1] = new X(34);
list[2] = new Y(38);
list[3] = new Y(27);
list[4] = new X(28);
int sum = 0;
for(int i=0; i<list.length; i++)
  sum+=list[i].get();
     out.println(sum);    //<*3>
```

QUESTION 27

What is output by the code on the right?

A. `[46, 26, 18, 15, 9, 38, 12, 45]`

B. `[9, 12, 15, 18, 26, 38, 45, 46]`

C. `[9, 15, 12, 45, 18, 38, 26, 46]`

D. `[9, 15, 45, 46, 12, 18, 38, 26]`

E. `[45, 12, 38, 9, 15, 18, 26, 46]`

```
PriorityQueue<Integer> x;
x = new PriorityQueue<>();
x.add(46);
x.add(26);
x.add(18);
x.add(15);
x.add(9);
x.add(38);
x.add(12);
x.add(45);
out.print(x);
```

QUESTION 28

What is returned by the method call `mys2("abcde")`?

A. `abcde`

B. `ababcabcd`

C. `cdedee`

D. `cdeee`

E. infinite recursion

QUESTION 29

What is returned by the method call `mys2("sturges")`?

A. `sturgesturgesrgesrges`

B. `turgesrgesrges`

C. `sststurgsturges`

D. `sturges`

E. `turgesurgesgesges`

```
public static String mys2(String x)
{
  char s = x.charAt(0);
  String y =
     x.substring((s+5)%x.length());
  if(x.equals(y))
     return y;
  return y+mys2(y);
}
```

QUESTION 30

Which of the following correctly replaces `<*1>` in the code to the right such that the value `211` is outputed?

A. `40` B. `131` C. `82` D. `46` E. `26`

```
x = <*1>;
System.out.println(x^145|x);
```

QUESTION 31

What would be printed out if an pre-order traversal is used on the tree to the right?

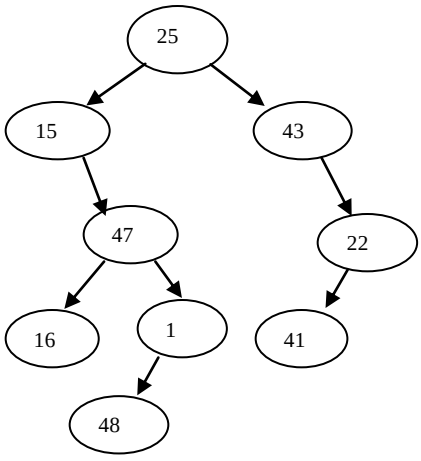
A. `16 48 1 47 15 41 22 43 25`

B. `25 15 47 16 1 48 43 22 41`

C. `25 15 43 47 22 16 1 41 48`

D. `1 15 16 22 25 41 43 47 48`

E. `15 16 47 48 1 25 43 41 22`



QUESTION 32

What is output by the code on the right?

A. `[2,12,15,17,19,35]`

B. `[2,2,12,19,35,17,15]`

C. `[2,15,35,19,17,12]`

D. `[2,12,19,35,17,15]`

E. `[2,2,12,15,17,19,35]`

```
Stack<Integer> st = new Stack<>();
ArrayList<Integer> list;
list = new ArrayList<>();
int[] x = {2,15,35,19,17,12};
for(int i=0; i<x.length; i++) {
  if(st.isEmpty())
     st.push(x[i]);
  while(!st.isEmpty()&&
         st.peek()>x[i])
     list.add(st.pop());
  st.push(x[i]);
  while(!list.isEmpty())
     st.push(list.remove(0));
}
out.println(st);
```

QUESTION 33

Which of the following correctly replaces `<*1>` in the code to the right such that `x` is split at the pipes (`|`) ?

A. `x.split("\\\|");`

B. `x.split("|");`

C. `x.split("^[a..z]");`

D. `x.split("[|]");`

E. `x.split("\|");`

QUESTION 34

What is output by the code on the right?

A. `[DAL, DEN, HEL, KC, LA, LV, P, SEA, SF, SL]`

B. `[P, SL, HEL, DEN, LV, LA, SF, SEA, KC, DAL]`

C. `[P, SL, HEL, DEN, SF, LA, LV]`

D. `[P, SF, SL, HEL, DEN, LV, LA]`

E. `[DEN, HEL, LA, LV, P, SF, SL]`

QUESTION 35

Assume the map created by the code to th e right was a directed graph instead. How many edges would the graph contain?

A. `13` B. `18`

C. `7` D. `9`

E. `10`

QUESTION 36

Which of the following is a simple path based on the graph created by the code to the right?

A. `LA LV SL P SF`

B. `SL HEL DEN SL`

C. `LA LV SL DEN P SF`

D. `LA LV SL P SL SF`

E. `LA LV SF`

```
String x;
x="P|SF|SL|HEL|DEN|LV|LA|SEA|DAL|KC";


String[] c = //<*1>


Map<String,String> map;
map = new TreeMap<String,String>();

map.put(c[0],c[1]);
map.put(c[0],c[2]);
map.put(c[2],c[0]);
map.put(c[2],c[3]);
map.put(c[3],c[4]);
map.put(c[4],c[2]);
map.put(c[2],c[1]);
map.put(c[1],c[2]);
map.put(c[1],c[6]);
map.put(c[6],c[1]);
map.put(c[6],c[5]);
map.put(c[5],c[2]);
map.put(c[5],c[6]);

out.println(map.keySet());
```

QUESTION 37

Which triplet (A,B,C) will make the circuit to the right true?

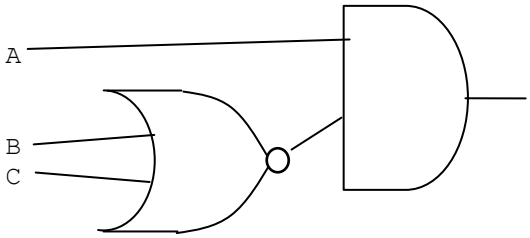
A. `(false,false,false)`

B. `(true,true,true)`

C. `(true,true,false)`

D. `(false,true,true)`

E. `(true,false,false)`



QUESTION 38

Convert the infix notation equation to the right into a prefix notation equation.

A. `EAAF+B-*DB+*CB-/-`

B. `-E/**A-+AFB+DB-CB`

C. `-E**/A+-AFB+DB-CB`

D. `EAAFB+-*DB+*CB/--`

E. `-EA*+-AFB*+DB/-CB`

```
E-A*(A+F-B)*(D+B)/(C-B)
```

QUESTION 39

OPEN ENDED QUESTION – Find the answer and write it on your answer sheet. If you are using a ScanTron form, write the question number and the answer on the bottom of the ScanTron.

Simplify the Boolean algebra expression.

```
ABC+AB
```

QUESTION 40

OPEN ENDED QUESTION – Fill in the blank spaces with the proper bits (1 or 0) and write it on your answer sheet. If you are using a ScanTron form, write the question number and the answer on the bottom of the ScanTron.

What is the binary representation of `x`?

bit	bit	bit	bit	bit	bit	bit	bit

```
byte x = (byte)(-56);
```