TAE Coding Java Review

1. First Program

1.1 First Java Program

```
public class HelloWorld {
    public static void main(String[] args) {
        // Prints "Hello, World"
        System.out.println("Hello, World");
    }
}
```

1.2 Declarationg and assignment

```
int a;  // declare
a = 1;  // intialize
int c = a + b;
```

1.3 built-in functions

example	return type	value
Integer.parseInt("123")	int	123
Double.parseDouble("1.2")	double	1.2
Math.sqrt(3 * 3 + 4 * 4)	double	5.0
Math.random()	double	randome in [0,1)
Math.round(3.141592)	long	3
Math.max(1,5)	double	5.0

1.4 type conversion

example	return type	value
(1 + 2) / 2.0	double	1.5
Math.sqrt(4)	double	2.0
"12" + 1	String	"121"

example	return type	value
2 * 0.5	double	1.0
(int)2 * 0.5	doulbe	1.0
2 * (int)0.5	int	0
(int)(2 * 0.5)	int	1

2. Flow control [Conditionals, loops]

1.1 absolute value of x

```
if (x < 0)
    x = -x;
```

2.2 put the smaller value in x and the larger value in y

```
if ( x > y) {
    int temp = x;
    x = y;
    y = temp;
}
```

2.3 maximum of x and y

```
if (x > y )
  max = x;
else
  max = y;
```

2.4 computes the largest power of 2 that is less than or equal to a given positive integer n.

```
int power = 1
while (power * 2 <= n){
  power *= 2;
}
System.out.println(power)
```

2.5 compute a sum: 1 + 2 + 3 .. + n

```
int sum = 0;
for(int i =1; i <= n; i++){
    sum += 1;
}
System.out.println(sum);
```

2.6 compute a finiter product: 1 * 2 * 3 * .. * n

```
int product = 1;
for(int i =1; i <= n; i++){
    product *= 1;
}
System.out.println(sum);
```

3. Arrays

3.1 create an array, "a" with double n random values

```
double[] a = new double[n];
for(int i =0; i < n; i++){
    a[i] = Math.random();
}
```

3.2 print the array, "a", one value per line

```
for(int i=0; i<a.length; i+) {
    System.out.println(a[i]);
}
```

3.3 find the maximum of the array values

```
double max = Double.NEGATIVE_INFINITY;
for(int i=0; i < a.length; i++){
    if(a[i] > max) {
        max = a[i];
    }
}
```

3.4 compute the average of the array values

```
double sum = 0;
for (int i =0; i < a.length; i++) {
    sum += a[i];
}
double average = sum / a.length;
```

3.5 reverse the values within an array

```
int n = a.length;
for (int i=0; i< n/2; i++){
    double temp = a[i];
    a[i] = a[n-1-i];
    a[n-1-i] = temp
}
```

3.6 copy sequence of values to another array

```
double b = new double[n];
for (int i = 0; i<a.length; i++){
    b[i] = a[i];
}
```

4. Function

4.1 Write a static method max3() that takes three int arguments and returns the value of the largest one.

```
public static int max3(int a, int b, int c) {
    if (a >= b && a >= c) return a;
    else if (a >= b && a >= c) return b;
    else return c;
}
```

4.2 Write a main function that read 10 integers from a file called file.in

```
    public static void main(String[] args) throws FileNotFoundException {
        Scanner scanner = new Scanner(new File("file.in"));
```

```
        int[] a = new int[10];
        for (int i = 0; i < 10; i++) {
            a[i] = scanner.nextInt();
        }
    }
```