

# CSE 101 Midterm 2

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1. What is the output of the following program?

```
int x = 5;
while (x < 10){
    x++;
    System.out.print(x);
}
```

- a) 678910
- b) 5678910
- c) 56789
- d) 6789
- e) 67891011

2. What is missing in the following code fragment?

```
int count;
while (count <= 8){
    System.out.println("Hi");
    count++;
}
```

- a) Setting the initial value of the loop variable
- b) Testing the value of the loop variable
- c) Increasing the value of the loop variable
- d) Decreasing the value of the loop variable
- e) None of the above

3. Which of the following codes print 10 times "Hello World" to the screen?

a) 

```
for (int i = 0; i < 10; i++)
    System.out.println("Hello World");
```

b) 

```
for (int i = 0; i < 10; i++)
    System.out.println(Hello World);
```

c) 

```
for (int i = 1; i < 10; i++)
    System.out.println("Hello World");
```

d) 

```
for (int i = 1; i <=10; i++)
    System.out.println(Hello World);
```

- e) None of the above

4. What will be the output of the following program?

```
int sum = 0;
for (int i = 0; i <= 20; i += 2){
    sum += i;
}
System.out.println(sum);
```

- a) 55
- b) 210
- c) 110
- d) 50
- e) sum

5. Let say you want to write a program which will take a positive number  $N$  as input from the user and prints the sum of integers until  $N$ . The following statements are given.

```
sum = sum + i;
Scanner input;
System.out.println(sum);
input = new Scanner(System.in);
for (int i = 1; i <= N; i++)
int sum = 0;
int N = input.nextInt ();
```

What is the correct order of statements if you want to accomplish this task?

- a) 7, 6, 2, 3, 4, 5, 1
- b) 2, 7, 6, 5, 3, 1, 4
- c) 2, 6, 4, 7, 5, 3, 1
- d) 4, 6, 2, 7, 5, 1, 3
- e) 6, 2, 4, 7, 5, 1, 3

6. Suppose your method does not return any value, which of the following keywords can be used as a return type?

- a) void
- b) int
- c) double
- d) boolean
- e) None of the above

7. Which of the following code blocks is the same as the following code block?

```
for (int i = 6; i > 0; i -= 2){
    System.out.println("2x" + i + "=" + i);
}
```

a)

```
System.out.println("2x6=6");
System.out.println("2x4=4");
System.out.println("2x2=2");
```

b)

```
System.out.println("2x6=12");
System.out.println("2x4=8");
System.out.println("2x2=4");
```

c)

```
System.out.println("2x6=12");
System.out.println("2x5=10");
System.out.println("2x4=8");
System.out.println("2x3=6");
System.out.println("2x2=4");
System.out.println("2x1=2");
```

d)

```
System.out.println("2x6=6");
System.out.println("2x5=5");
System.out.println("2x4=4");
System.out.println("2x3=3");
System.out.println("2x2=2");
System.out.println("2x1=1");
```

```
System.out.println("2x3=6");
System.out.println("2x2=4");
System.out.println("2x1=2");
```

8. Consider the following incomplete code:

```
public class Test{
    public static void main(String[] args){
        System.out.println(f(3));
    }
    public static int f(int number){
        // Missing body
    }
}
```

The missing method body could be

- a) `return "number"`
- b) `return number`
- b) `System.out.println(number)`
- b) `System.out.println("number")`
- e) None of the above

9. Suppose you are given a method named `gcd` that calculates and returns the greatest common divisor of two integer numbers. Which of the following is the correct statement to call `gcd` method?

- a) `int result = gcd(int x, int y)`
- b) `double result = gcd(x, y)`
- c) `int result = gcd(x, y)`
- d) `double result = gcd(int x, int y)`
- e) `int result = call gcd(x, y)`

10. Suppose you are given method named `maxDigit` that takes an integer number as input parameter and returns its maximum digit. For example, for input 574186 your method should return 8. Which of the following is a correct method header for `maxDigit` method?

- a) `public static void maxDigit(int n)`
- b) `public static int maxDigit(n)`
- c) `public static int maxDigit(int n)`
- d) `public static double maxDigit(int n)`
- e) `public static void maxDigit(n)`

11. Consider the following for loop

```
for (A; B; C){
}
```

How do you convert this for loop into a while loop?

a)

```
A;
while (B){
}
C;
```

b)

```
B;
while (A){
    C;
}
```

c)

```
A;
while (C){
    B;
}
```

d)

```
A;
B;
while (C){
}
```

e)

```
A;
while (B){
    C;
}
```

12. What will be the output of the following program?

```
int sum = 0;
for (int i = 1; i <= 10; i ++){
    for (int j = 10; j >= i; j --){
        sum++;
    }
}
System.out.println(sum);
```

- a) 55
- b) 210
- c) 110
- d) 50
- e) None of the above

13. What will be the output of the following program?

```
int sum = 0;
for (int i = 1; i <= 5; i ++){
    for (int j = i; j <= 5; j++){
        for (int k = j; k <= 5; k++){
            sum++;
        }
    }
}
System.out.println(sum);
```

- a) 55
- b) 35
- c) 210
- d) 50
- e) 110

14. What will be the output of the following program?

```
for (int i = 1; i <= 3; i ++){
    for (int j = 1; j <= 3; j++){
        System.out.print("*");
    }
}
```

- a) \*\*\*  
\*\*\*  
\*\*\*
- b) \*\*\*  
\*\*  
\*
- c) \*  
\*\*  
\*\*\*
- d) \*\*\*\*\*
- e) None of the above

15. What will be the output of the following program?

```
for (int i = 1; i <= 3; i ++){
    for (int j = 1; j <= 3; j++){
        System.out.print("*");
    }
    System.out.println ();
}
```

- a) \*\*\*  
\*\*\*  
\*\*\*
- b) \*\*\*  
\*\*  
\*
- c) \*  
\*\*  
\*\*\*
- d) \*\*\*\*\*
- e) \*\*\*  
\*  
\*\*\*

16. What will be the output of the following program?

```
for (int i = 1; i <= 3; i ++){
    for (int j = 1; j <= i; j++){
        System.out.print("*");
    }
    System.out.println ();
}
```

- a) \*\*\*  
\*\*\*  
\*\*\*
- b) \*\*\*  
\*\*  
\*
- c) \*  
\*\*  
\*\*\*
- d) \*\*\*\*\*
- e) \*  
\*  
\*  
\*  
\*  
\*  
\*  
\*

17. Consider the following program:

```
public static void main(String[] args){
    Scanner s = new Scanner(System.in);
    int N = s.nextInt ();
    int k = 1;
    for (int i = 1; i <= N; i++){
        k = k * i;
    }
    System.out.println(k);
}
```

How do you convert this program into a method?

a)

```
public static int f(int N){
    int k = 1;
    for (int i = 1; i <= N; i++){
        k = k * i;
    }
    System.out.println(k);
}
```

b)

```
public static int f(int N){
    int k = 1;
    for (int i = 1; i <= N; i++){
        k = k * i;
    }
    return k;
}
```

c)

```
public static void f(){
    int k = 1;
    for (int i = 1; i <= N; i++){
        k = k * i;
    }
    return k;
}
```

d)

```
public static int f(int N){
    N = s.nextInt ();
    int k = 1;
    for (int i = 1; i <= N; i++){
        k = k * i;
    }
    return k;
}
```

e)

```
public static void f(){
    N = s.nextInt ();
    int k = 1;
    for (int i = 1; i <= N; i++){
        k = k * i;
    }
    System.out.println(k);
}
```

18. Which of the following code fragments calculate the following sum:

$$\frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{N}$$

a)

```
double sum = 0;
int i = 1;
while (i >= N){
    sum = sum + 1 / i;
    i++;
}
```

b)

```
double sum = 0;
for (int i = 2; i <= N; i++){
    sum = sum + 1 / i;
}
```

c)

```
double sum = 0;
int i = 1;
while (i <= N){
    sum = sum + 1.0 / i;
}
```

d)

```
double sum = 0;
for (int i = 2; i <= N; i++){
    sum = sum + 1.0 / i;
}
```

e)

```
int sum = 0;
int i = 1;
while (i <= N){
    sum = sum + 1 / i;
    i++;
}
```

19. What is the output of the following program?

```
int x = 5;
while (x < 10){
    x++;
    if (x > 7){
        break;
    }
    System.out.print(x);
}
```

a) 678

b) 567

c) 56789

d) 67

e) 6789

20. Let say you have the following function defined:

```
public static void printStar(int n){
    for (int i = 1; i <= n; i++){
        System.out.print("*")
    }
    System.out.println ();
}
```

Which of the following code fragments produce the following output?

```
*
**
***
**
*
```

a)

```
printStar (1);
printStar (2);
printStar (3);
printStar (2);
printStar (1);
```

b)

```
printStar (1);
printStar (2);
printStar (3);
```

c)

```
printStar (3);
printStar (2);
printStar (1);
```

d)

```
printStar (3);
printStar (2);
printStar (1);
printStar (2);
printStar (3);
```

e)

```
printStar (3, 3);
```

21. Let say you have the functions factorial and power

```
public static int factorial (int N)
public static int power(int x, int y)
```

which calculate  $N!$  and  $x^y$  respectively. Which of the following code fragments then calculate the following sum:

$$\frac{1!}{2^1} + \frac{2!}{2^2} + \dots + \frac{N!}{2^N}$$

a)

```
double sum = factorial(N) / power(2, N);
```

b)

```
double sum = 0;
for (int i = 1; i <= N; i++){
    sum += (factorial (i) + 0.0) / power(2, N);
}
```

c)

```
double sum = 0;
for (int i = 1; i <= N; i++){
    sum += (factorial (N) + 0.0) / power(2, i);
}
```

d)

```
double sum = 0;
for (int i = 1; i <= N; i++){
    sum += factorial (i) / power(2, i);
}
```

e)

```
double sum = 0;
for (int i = 1; i <= N; i++){
    sum += (factorial (i) + 0.0) / power(2, i);
}
```

22. Let say you have the function factorial

```
public static int factorial (int N)
```

which calculates  $N!$ . Which of the following code fragments then calculate the following:

$$C = \frac{N!}{M!(N - M)!}$$

a)

```
C = factorial (N, M)
```

b)

```
double C = 0;
for (int i = 1; i <= N; i++){
    C += factorial (N, M);
}
```

c)

```
C = factorial (N) / factorial (M) * factorial (N - M);
```

d)

```
C = factorial (N) / ( factorial (M) * factorial (N - M));
```

e)

```
double C = 0;
for (int i = 1; i <= M; i++){
    C += factorial (N, i);
}
```

23. Let say you have the function gcd

```
public static int gcd(int x, int y)
```

which calculates greatest common divisor of  $x$  and  $y$ . If the least common multiple of  $x$  and  $y$  can be calculated as

$$lcm(x, y) = xy / gcd(x, y)$$

Which of the following code fragments calculate the least common multiple of  $x$  and  $y$ ?

a)

```
lcm = xy / gcd(x, y);
```

b)

```
lcm = x * y / gcd(x, y);
```

c)

```
double lcm = 0;
for (int i = 1; i <= y; i++){
    lcm += gcd(x, i);
}
```

d)

```
lcm = x * y / gcd(x);
```

e)

```
double lcm = 0;
for (int i = 1; i <= x; i++){
    lcm += gcd(i, y);
}
```

24. Let say you have the function isPrime

```
public static boolean isPrime(int N)
```

which returns **true** if  $N$  is prime, **false** otherwise. Which of the following code fragments prints all prime numbers less than 100?

a)

```
System.out.println(isPrime(100));
```

b)

```
for (int i = 2; i <= 100; i++){
    System.out.println(isPrime(i));
}
```

c)

```
for (int i = 2; i <= 100; i++){
    if (isPrime(i)){
        System.out.println(i);
    }
}
```

d)

```
for (int i = 2; i <= 100; i++){
    System.out.println(i);
}
```

e)

```
isPrime(100);
```

25. Consider the following while loop

```
A;
while (B){
}
C;
```

How do you convert this while loop into a for loop?

a)

```
for (A; B; C){
}
```

b)

```
for (A; B; ){
}
C;
```

c)

```
for (A; B; C){
    B;
}
```

d)

```
A;
for (; B; C){
}
```

e)

```
A;
for (B; C; ){
}
```