iti1120, Practice Midterm , 1h20m

Write your name and student number on the top of this question sheet.

Circle exactly one answer for each multiple-choice question. In cases where there is more than once correct answer, select the most correct/precise answer. For non-multiple choice questions, write only in the spaces provided. Everything outside will not be graded. After 1h and 20min finishes, submit only the exam sheets that you received.

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1. **(1 point)** What does this program print?

```
public class mid {
  public static void main (String[] args)
  {
  int x=5;
  double y=20.0, z;
  z=1+x/y;
  System.out.println(z);

  }
}
```

(a) 0.0 (b) 0.25 (c) 1.0 (d) 1.25

(e) unpredictable

2. **(1 point)** Which of the statements below is correct about the following program?

```
public class mid {
  public static void main (String[] args)
  {
  int x=5;
  if(x<10)
    System.out.println("i am less than 10");
  else if(x<=8)
   System.out.println("i am less than equal to 8");
  else
    System.out.println("what am i?");
  }
}
```

(a) Only the first `System.out.println` call is executed.

(b) Only the second `System.out.println` call is executed.

(c) The first and the second `System.out.println` calls are executed.

(d) All three `System.out.println` calls are executed.

(e) none of the above

3. **(1 point)** What does this program print?

```
public class mid {
  public static void main (String[] args)
  {
```

```
    int x=7, sum=0;
    while(x!=3)
    {
      sum=sum+x;
      x--;
    }
     System.out.println(sum);
  }
}
```

(a) 0 (b) 18 (c) 22 (d) 25

(e) the program goes into infinite loop

4. **(1 point)** Which one of the statements below is correct about the following method?

```
public static void foo( boolean a, boolean b){
    if( a )
    {
        System.out.println("A");
    }
    else if(a && b)
    {
        System.out.println("A && B");
    }
    else
    {
        if ( !b )
        {
            System.out.println("notB");
        }
        else
        {
            System.out.println("ELSE");
        }
    }
}
```

(a) If `a` is true and `b` is true, then the method prints `A && B`

(b) If `a` is true and `b` is false, then the method prints `notB`

(c) If `a` is false and `b` is true, then the method prints ELSE

(d) if `a` is false and `b` is false, then the method prints ELSE

(e) none of the above

5. **(1 point)** The reserved word used to transfer control from a method back to the calling method is

(a) void

(b) return

(c) goto

(d) none of the above

6. **(2 points)** What is printed by the 2 print calls in the following program?

```
public class  mid{
  public static void main(String[] args) {
    int x=5;
    int[] A = {1, 2, 3, 4, 5};

    System.out.println( (A[1] < A[x-1]) && (! (x - 5 + A[A[1]] > 9) ) );

    System.out.println( (A[3] % 2 == 1) || (x - 2 > A[A[0] +1]) );

  }
}
```

First one prints: _____

Second one prints: _____

7. **(1 point)** Which one of the statements below is correct about the following method?

```
public static void foo ()
{
  int x = 10;
  int y = 100 % 90;
  for(int i=0; i<3; i++){
    if(x!=y){
       System.out.println("aha");
    }
  }
}
```

(a) It prints `aha` four times

(b) It prints `aha` three times

(c) It prints `aha` two times

(d) It prints `aha` one time

(e) It prints `aha` zero times

8. **(1 point)** Write, in the rectangle below, a header of a method called `are_equal` that takes as an input two integers and one double number and returns a letter 'y' if all three numbers all equal and a letter 'n' otherwise. (Note that you are asked to write only the method header, and not the body of the method)

9. **(1 point)** Write, in the rectangle below, a header of a method called `lines` that takes as input an integer, `x`, and a character and prints `x` times that character.

10. **(1 point)** Which one of the following statements is correct about the following method (whose input is a positive integer)?

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

(a) The method calculates the value of 1 raised to power num.

(b) The method calculates the square root of an integer

(c) The method calculates the factorial value of an integer

(d) none of the above

11. **(1 point)** What does the following program print?

```
public class mid
{
  public static void main (String[] args)
  {
   int max=0;                \\ line 1
   maximum(1, 2, max);       \\ line 2
   System.out.println(max);  \\ line 3
  }

  public static void maximum(int num1, int num2, int max) \\line 4
  {
    if(num1>num2)        \\line 5
      max=num1;          \\line 6
    else                 \\line 7
      max=num2;          \\line 8
  }                      \\line 9

}
```

12. **(2 points)** In the preceeding question, what are the local variables (and their values) that have space allocated in the memory

(a) just before the method `maximum` is called (i.e. right before line 2 is executed.)

(b) just before the method `maximum` returns (i.e. right before line 9 is executed)

(c) right after the method `maximum` returnes, (i.e. right before line 3 is executed)

(a)

(b)

(c)

13. **(2 points)**

(a) What does the following program print?

(b) What does the program do (use plain language to answer this part).

```
public class mid {
  public static void main (String[] args)
  {

   int[] arr = {1, 1, 4, 0, 0, 0, 5, 3, 0, 0};
   int i;

   for(i=0; i<arr.length; i++)
    {
      System.out.print(arr[i]);
      if(arr[i]==0)
      {
        while(i+1<arr.length && arr[i+1]==0)
        {
          i++;
        }
      }
    }


  }
}
```

(a)

(b)

14. **(1 point)** What is printed by the following program?

```
public class  mid{
    public static void main (String[] args)
    {
        int [] a = new int[] {10, 20, 30, 40, 50};

        int k = 3;

        triple(a, k);

        System.out.print(a[2] + k);
    }

     public static void triple ( int [] a, int k)
     {
       k = k - 1;
       a[k] = 3 * a[k];
     }
}
```

15. **(1 points)** Why does the following program crash during execution? What line causes the crash?

```
public class  mid{
  public static void main(String[] args) {

    int[] A;                          \\ line 1
    A= new int[] {1, 2, 3, 4, 5, 6}; \\ line 2

    A[A[3]]=100;                      \\ line 3

    System.out.println(A[4] + A[6]); \\ line 4
  }
}
```

16. **(2 point)** What is printed by the following program?

```
public class  mid{
  public static void main(String[] args) {

    int[] A;
    A= new int[] {1, 2, 3, 4};
    int[] B;
    B= new int[] {10, 20, 30, 40};

    B=A;

    B[2]=100;
    System.out.println(A[2]);
    System.out.println(B[2]);
  }
}
```

17. **(3 points)** Write, in the space below (between the two curly braces) the code of the following Java method called `num_letters`. The input paramter to the method is an array, called `C`, of characters, (or more precisely a reference to an array of characters). The method should count the number of elements of the array that are letters of the English alphabet, and return that number.

```
public static int num_letters(char[] C)
 {









 }
```

18. **(4 points)** Write, in the space below (between the two curly braces) the code of the following Java method, called `moveZeros`. The input parameter to the method is an array of integers, called `arr` (or more precisely a reference to an array of integers). Assume that the array has exactly two zeros and the rest of the elements are non-zero integers. Method `move_zeros` has to move both zeros to the end of the array (without creating any extra arrays). For example, if the input array, `arr`, has the following elements $-20, 0, 13, 0, 2$, after `moveZeros` method completes the array should look like this $-20, 2, 13, 0, 0$. Anoter example: if the input array, `arr`, has the following elements $2, 0, 0, 5, 5, 5$, after `moveZeros` method completes the array should look like this $2, 5, 5, 5, 0, 0$. You may assume that the input array (referenced by) `arr`, has at least 2 elements.

```
public static void moveZeros(int[] arr){









}
```

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