1. **WHAT** is a *data type*?

2. **GIVE THREE EXAMPLES** of data types.
   
   (a) 
   
   (b) 
   
   (c) 

3. **WHAT** is a variable?

4. **WHAT FOUR THINGS** does every variable have?
   
   (a) 
   
   (b) 
   
   (c) 
   
   (d) 

5. For each of the above four things, **WHO** chooses it?
   
   (a) 
   
   (b) 
   
   (c) 
   
   (d) 

6. **WHICH** of the above four things does the statement below cause to be set?
   
   ```
   int x;
   ``` 

7. **WHICH** of the above four things does the statement below cause to be set?
   
   ```
   float y = 22.7;
   ```
8. **WHAT** is *compile time*?

9. **WHAT** is *runtime*?

10. **WHAT** is a *declaration* (also known as a *declaration statement*)?

11. If a variable is declared but not initialized, and it has not yet been given a value, then **WHAT VALUE** does it have?

12. Some compilers on some computers automatically initialize newly declared variables to default values. **UNDER WHAT CIRCUMSTANCES** should you explicitly initialize or assign a value to a variable, rather than letting the compiler initialize it to the default value?

13. **HOW MANY VALUES** does a variable have at any given moment in runtime? **BE VERY SPECIFIC.**

14. **HOW MANY VALUES** can a variable take on over the entire duration of a run?

15. **WHAT** is the *declaration section* of a program?

16. **WHERE** in a program is the declaration section?

17. **WHAT IS THE NAME** of the other section of a program?

18. **WHERE** in a program is that other section?

19. **NAME** three ways to set the value of a variable.
   (a)
   (b)
   (c)
20. **WHAT** does an assignment statement do?

21. **GIVE AN EXAMPLE** of an assignment statement.

22. Is an assignment an **ACTION** or an **EQUATION**?

23. In an assignment, **ON WHICH SIDE OF THE SINGLE EQUALS SIGN** is the name of the variable whose value is being set?

24. In an assignment, **ON WHICH SIDE OF THE SINGLE EQUALS SIGN** is the value that the variable is being set to?

25. **WHAT** is an **initialization**?

26. **GIVE AN EXAMPLE** of an initialization statement.

27. For the initialization example above, **WHAT WOULD BE THE EQUIVALENT** if expressed as a declaration followed by an assignment?

28. In C, **WHICH CHARACTERS** can be in an **IDENTIFIER** such as a variable name?

29. In C, **WHICH CHARACTERS** can be at the **BEGINNING** of an **IDENTIFIER** such as a variable name?

30. **WHAT** is the **favorite professor rule**?

31. **MARK** valid C variable names **VALID** and invalid C variable names **INVALID**. For invalid C variable names, **EXPLAIN WHY** they are invalid. (Note that **valid** means acceptable to the compiler, rather than good programming practice.)
   
   (a) number_of_students_in_CS1313
   (b) number of students in CS1313
   (c) 2_to_tango
   (d) WHAZZAT
   (e) Huh?
32. For each of the following, **WRITE A DECLARATION STATEMENT** for a variable representing this quantity. For each, you should choose an appropriate data type. The name should comply with the “favorite professor” rule, and should also be a valid C identifier. **You DON’T need to initialize the variables.** Assume that *int* variables and *float* variables take 4 bytes (32 bits) each.

(a) the number of students in CS1313

(b) your height in lightyears (a lightyear is the distance that light travels in a year, which is about 6 trillion miles).

(c) a spaceship’s speed in inches per century, approximated to three significant figures (assume that the spaceship travels at 99% of the speed of light)

(d) the number of books on a bookshelf

33. **WHAT** does a placeholder **DO?**

34. **WHAT IS THE PLACEHOLDER** for each of these data types?

(a) int

(b) float

(c) char

35. When a user is inputting multiple values from the keyboard, **WHICH CHARACTERS** may they use to separate the values being input?
36. Compare `printf` to `scanf`.

(a) Does it **OUTPUT** or **INPUT**?

`printf`:

`scanf`:

(b) **TO/FROM WHERE** does it output/input?

`printf`:

`scanf`:

(c) Its string literal **CAN** or **CANNOT** contain literal text (other than a single blank space as a separator between each set of multiple placeholders)?

`printf`:

`scanf`:

(d) Its string literal **CAN** or **CANNOT** contain a newline (for example, at the end of the string literal)?

`printf`:

`scanf`:

(e) The variable name(s) associated with placeholder(s) **MUST** or **CANNOT** be preceded by an ampersand (`&`)?

`printf`:

`scanf`: 
37. **WHAT IS THE OUTPUT** of each of these programs? Examine the programs **CAREFULLY**. You do not need to include extraneous blank spaces in your answer. If a program will not compile, mark **WON’T COMPILIE** and **EXPLAIN**. If a program compiles and runs but does not produce any output, mark **NO OUTPUT** and **EXPLAIN**. If a program compiles and runs but produces garbage output, mark **GARBAGE** and **EXPLAIN**. If you are not confident of your answer, type in, compile and run the programs.

(a)  
```c
#include <stdio.h>
int main ()
{ /* main */
    int woopdedoo;
    woopdedoo = 127;
    printf("%d\n", woopdedoo);
} /* main */
```

(b)  
```c
#include <stdio.h>
int main ()
{ /* main */
    int yippee = 127;
    printf("yippee = %d\n", yippee);
} /* main */
```

(c)  
```c
#include <stdio.h>
int main ()
{ /* main */
    int oyvey = 127;
    oyvey = 128;
    printf("oyvey = %d\n", oyvey);
} /* main */
```

(d)  
```c
#include <stdio.h>
int main ()
{ /* main */
    int ladeedah;
    printf("%d\n", ladeedah);
} /* main */
```
38. **CHANGE THE ORDER** of the lines below so that the program outputs that the mass is 5.75 kilograms. You **MUST** use **EVERY SINGLE LINE SHOWN BELOW**.

```c
#include <stdio.h>

int main ()
{
    float mass_in_kg;
    mass_in_kg = 5.75;
    printf("Mass: %f kg\n", mass_in_kg);
}

int main ()
{
    mass_in_kg = 10.5;
    printf("Mass: %f kg\n", mass_in_kg);
}
```

39. **CHANGE THE ORDER** of the lines below so that the program outputs meaningful output. You **MUST** use **EVERY SINGLE LINE SHOWN BELOW**.

```c
#include <stdio.h>

int main ()
{
    float age_in_years;
    age_in_years = 5.75;
    printf("Let me guess your age!\n");
    printf("What is your age in years?\n");
    scanf("%f", &age_in_years);
    printf("I’d guess that your age is %f years.\n", age_in_years);
}
```

If you use **ANY** resources other than Dr. Neeman, the TAs (Gheibi, Reynolds, Sadri), the course textbook or the materials posted on the course webpage, you **MUST** reference them on the quiz. **THIS INCLUDES CLASSMATES, FRIENDS, PROFESSORS, ONLINE RESOURCES, ETC.**