```c
// A program that says hello to the world

#include <stdio.h>

int main(void)
{
    printf("hello, world\n");
}
```

```
 1   // get_string and printf with %s
 2
 3   #include <cs50.h>
 4   #include <stdio.h>
 5
 6   int main(void)
 7   {
 8       string answer = get_string("What's your name? ");
 9       printf("hello, %s\n", answer);
10   }
```

```c
// Addition with int

#include <cs50.h>
#include <stdio.h>

int main(void)
{
    // Prompt user for x
    int x = get_int("x: ");

    // Prompt user for y
    int y = get_int("y: ");

    // Perform addition
    printf("%i\n", x + y);
}
```

```
1   // Addition with long
2
3   #include <cs50.h>
4   #include <stdio.h>
5
6   int main(void)
7   {
8       // Prompt user for x
9       long x = get_long("x: ");
10
11      // Prompt user for y
12      long y = get_long("y: ");
13
14      // Perform addition
15      printf("%ld\n", x + y);
16  }
```

```
1   // Division with integers, demonstrating truncation
2
3   #include <cs50.h>
4   #include <stdio.h>
5
6   int main(void)
7   {
8       // Prompt user for x
9       int x = get_int("x: ");
10
11      // Prompt user for y
12      int y = get_int("y: ");
13
14      // Divide x by y
15      float z = x / y;
16      printf("%f\n", z);
17  }
```

```c
// Conditionals, Boolean expressions, relational operators

#include <cs50.h>
#include <stdio.h>

int main(void)
{
    // Prompt user for points
    int points = get_int("How many points did you lose? ");

    // Compare points against mine
    if (points < 2)
    {
        printf("You lost fewer points than me.\n");
    }
    else if (points > 2)
    {
        printf("You lost more points than me.\n");
    }
    else if (points == 2)
    {
        printf("You lost the same number of points as me.\n");
    }
}
```

```c
// Design

#include <cs50.h>
#include <stdio.h>

int main(void)
{
    // Prompt user for points
    int points = get_int("How many points did you lose? ");

    // Compare points against mine
    if (points < 2)
    {
        printf("You lost fewer points than me.\n");
    }
    else if (points > 2)
    {
        printf("You lost more points than me.\n");
    }
    else
    {
        printf("You lost the same number of points as me.\n");
    }
}
```

```c
// Constants

#include <cs50.h>
#include <stdio.h>

int main(void)
{
    // Number of points that I lost
    const int MINE = 2;

    // Prompt user for points
    int points = get_int("How many points did you lose? ");

    // Compare points against mine
    if (points < MINE)
    {
        printf("You lost fewer points than me.\n");
    }
    else if (points > MINE)
    {
        printf("You lost more points than me.\n");
    }
    else
    {
        printf("You lost the same number of points as me.\n");
    }
}
```

```c
// Calculates a remainder

#include <cs50.h>
#include <stdio.h>

int main(void)
{
    // Prompt user for integer
    int n = get_int("n: ");

    // Check parity of integer
    if (n % 2 == 0)
    {
        printf("even\n");
    }
    else
    {
        printf("odd\n");
    }
}
```

```c
// Logical operators

#include <cs50.h>
#include <stdio.h>

int main(void)
{
    // Prompt user to agree
    char c = get_char("Do you agree? ");

    // Check whether agreed
    if (c == 'Y' || c == 'y')
    {
        printf("Agreed.\n");
    }
    else if (c == 'N' || c == 'n')
    {
        printf("Not agreed.\n");
    }
}
```

```c
// Opportunity for better design

#include <stdio.h>

int main(void)
{
    printf("meow\n");
    printf("meow\n");
    printf("meow\n");
}
```

```c
// Better design

#include <stdio.h>

int main(void)
{
    for (int i = 0; i < 3; i++)
    {
        printf("meow\n");
    }
}
```

```c
// Abstraction

#include <stdio.h>

void meow(void);

int main(void)
{
    for (int i = 0; i < 3; i++)
    {
        meow();
    }
}

// Meow once
void meow(void)
{
    printf("meow\n");
}
```

```c
// Abstraction with parameterization

#include <stdio.h>

void meow(int n);

int main(void)
{
    meow(3);
}

// Meow some number of times
void meow(int n)
{
    for (int i = 0; i < n; i++)
    {
        printf("meow\n");
    }
}
```

```c
// No return value

#include <cs50.h>
#include <stdio.h>

int main(void)
{
    float regular = get_float("Regular Price: ");
    float sale = regular * .85;
    printf("Sale Price: %.2f\n", sale);
}
```

```c
1   // Return value
2
3   #include <cs50.h>
4   #include <stdio.h>
5
6   float discount(float price);
7
8   int main(void)
9   {
10      float regular = get_float("Regular Price: ");
11      float sale = discount(regular);
12      printf("Sale Price: %.2f\n", sale);
13  }
14
15  // Discount price
16  float discount(float price)
17  {
18      return price * .85;
19  }
```

```c
// Return value, multiple arguments

#include <cs50.h>
#include <stdio.h>

float discount(float price);

int main(void)
{
    float regular = get_float("Regular Price: ");
    int percent_off = get_int("Percent Off: ");
    float sale = discount(regular, percent_off);
    printf("Sale Price: %.2f\n", sale);
}

// Discount price
float discount(float price, int percentage)
{
    return price * (100 - percentage) / 100;
}
```

```
1   // Prints a row of 4 question marks
2
3   #include <stdio.h>
4
5   int main(void)
6   {
7       printf("????\n");
8   }
```

```c
// Prints a row of 4 question marks with a loop

#include <stdio.h>

int main(void)
{
    for (int i = 0; i < 4; i++)
    {
        printf("?");
    }
    printf("\n");
}
```

```
1    // Prints a row of n question marks with a loop
2
3    #include <cs50.h>
4    #include <stdio.h>
5
6    int main(void)
7    {
8        int n;
9        do
10       {
11           n = get_int("Width: ");
12       }
13       while (n < 1);
14       for (int i = 0; i < n; i++)
15       {
16           printf("?");
17       }
18       printf("\n");
19   }
```

```
1    // Prints an n-by-n grid of bricks with a loop
2
3    #include <cs50.h>
4    #include <stdio.h>
5
6    int main(void)
7    {
8        int n;
9        do
10       {
11           n = get_int("Size: ");
12       }
13       while (n < 1);
14       for (int i = 0; i < n; i++)
15       {
16           for (int j = 0; j < n; j++)
17           {
18               printf("#");
19           }
20           printf("\n");
21       }
22   }
```

```c
// Floating-point imprecision

#include <cs50.h>
#include <stdio.h>

int main(void)
{
    // Prompt user for x
    float x = get_float("x: ");

    // Prompt user for y
    float y = get_float("y: ");

    // Divide x by y
    float z = x / y;
    printf("%.50f\n", z);
}
```

```c
1   // Truncation
2
3   #include <cs50.h>
4   #include <stdio.h>
5
6   int main(void)
7   {
8       // Prompt user for x
9       long x = get_long("x: ");
10
11      // Prompt user for y
12      long y = get_long("y: ");
13
14      // Divide x by y
15      float z = x / y;
16
17      // Perform division
18      printf("%f\n", z);
19  }
```

```c
// Libraries (e.g., rounding with 4.20)

#include <cs50.h>
#include <math.h>
#include <stdio.h>

int main(void)
{
    float amount = get_float("Dollar Amount: ");
    int pennies = round(amount * 100);
    printf("Pennies: %i\n", pennies);
}
```