HOUR OF CODE 2021 (TIMECRAFT)
CODING SOLUTIONS

The following coding solutions provide one beginner and one more advanced/intermediate solution for each Time Split in both **Block** and **Python**. However, students may find multiple solutions which reach the same successful outcome.

HOUR OF CODE 2021: CODING SOLUTIONS (MakeCode Blocks)

The coding solutions shown below provide one beginner and one more advanced solution for each time split. However, students may find multiple solutions which reach the same successful outcome.

Improving Code in Blocks
What if there is a command that you want your Time Agent to perform over and over again?

Although students could use the same MakeCode block 15 times, or even copy and paste them to save some time, there is a more efficient way to code. Using loops in coding will save students lots of time as they learn more about programming.

Select a "repeat" block from the Loops drawer, type in the number of times you want those commands to repeat, and then place those commands into the repeat block. Make sure the blocks are in the right order, and only include the blocks you want to be repeated!

Time Split 1: Big Band Jazz

Students may discover multiple solutions for this time split and still reach a successful outcome.

Beginner Solution Example	More Advanced Solution Example
	The beginner solution is also the most advanced solution, although students may reach various solutions that still achieve the same outcome.

Time Split 2: Pyramids of Giza

Students may discover multiple solutions for this time split and still reach a successful outcome.

Beginner Solution Example	More Advanced Solution Example

Beginner Solution Example

```
on start
    agent move forward by 1
    agent place back
    agent move forward by 1
    agent place back
    agent move forward by 1
    agent place back
    agent move up by 1
    agent turn left
    agent turn left
    agent move forward by 1
    agent move forward by 1
    agent move forward by 1
    agent place back
```

More Advanced Solution Example

```
on start
    repeat 3 times
    do
        agent move forward by 1
        agent place back

    agent move up by 1
    agent turn left
    agent turn left
    agent move forward by 1
    agent move forward by 1
    agent move forward by 1
    agent place back
```

Time Split 3: Moon Mission
Students may discover multiple solutions for this time split and still reach a successful outcome.

Beginner Solution Example	More Advanced Solution Example
	The beginner solution is also the most advanced solution, although students may reach various solutions that still achieve the same outcome.

Time Split 4: The Great Wall of China
Students may discover multiple solutions for this time split and still reach a successful outcome.
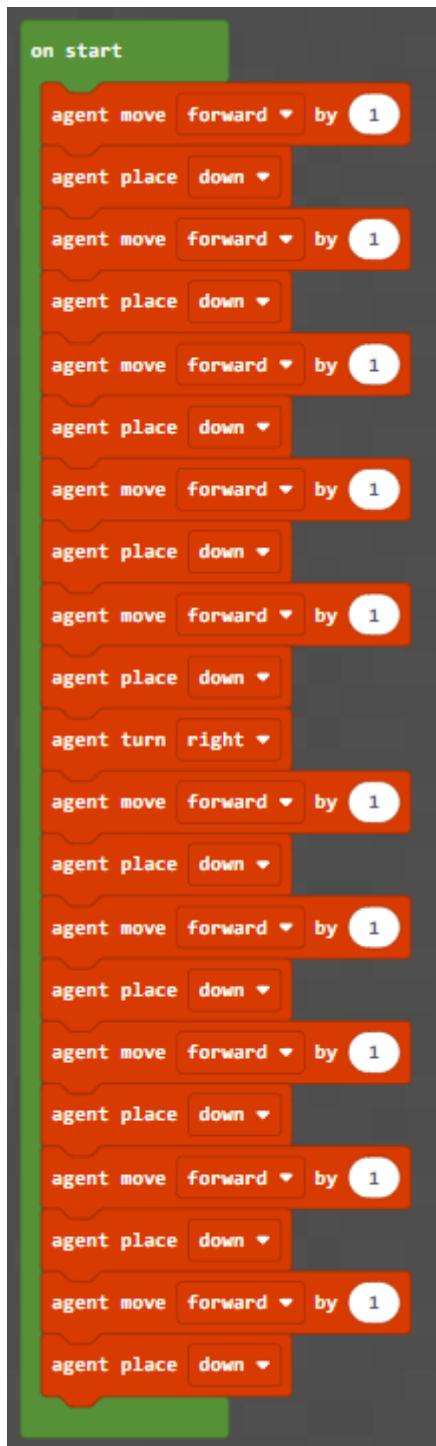
Beginner Solution Example	More Advanced Solution Example
on start agent place down agent move forward by 1 agent place down agent move forward by 1 agent place down agent move forward by 1 agent place down agent move forward by 1 agent place down agent move forward by 1	on start repeat 5 times do agent place down agent move forward by 1

Time Split 5: The Mona Lisa

Students may discover multiple solutions for this time split and still reach a successful outcome.

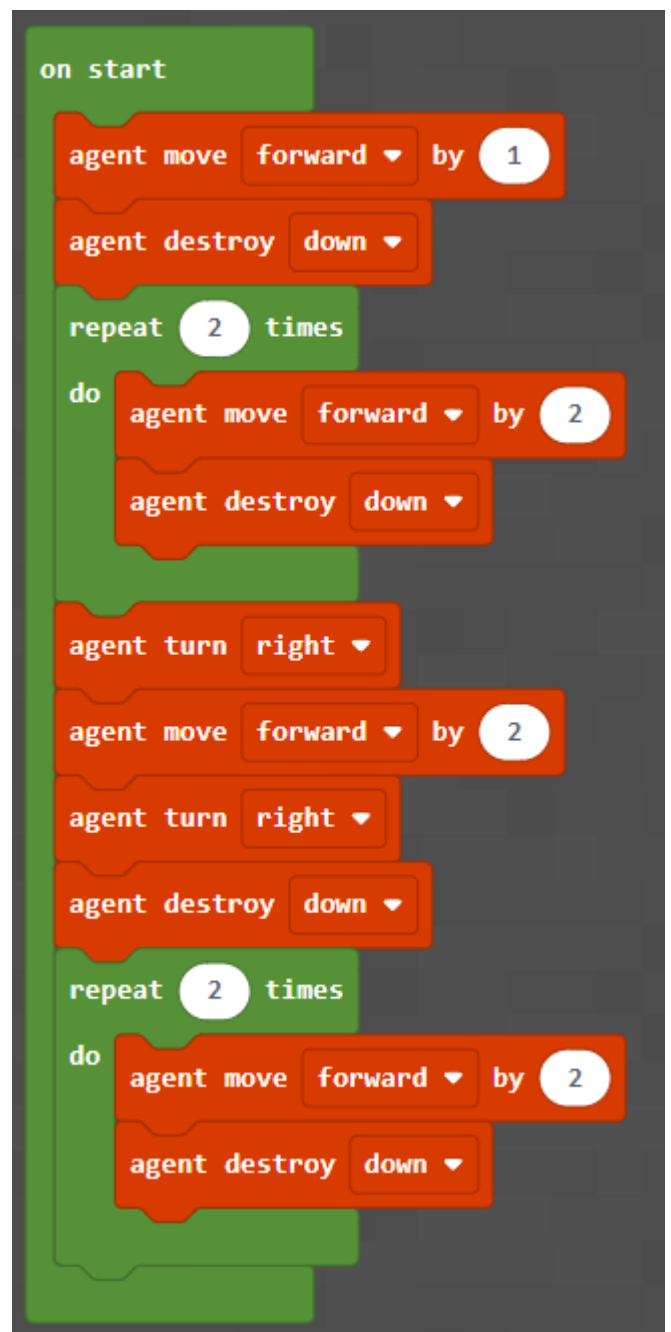| Beginner Solution Example	More Advanced Solution Example
on start	on start

```
on start
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent turn right
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
```

```
on start
    repeat 5 times
    do
        agent move forward by 1
        agent place down

    agent turn right

    repeat 5 times
    do
        agent move forward by 1
        agent place down
```

Time Split 6 – First Flights

Students may discover multiple solutions for this time split and still reach a successful outcome.
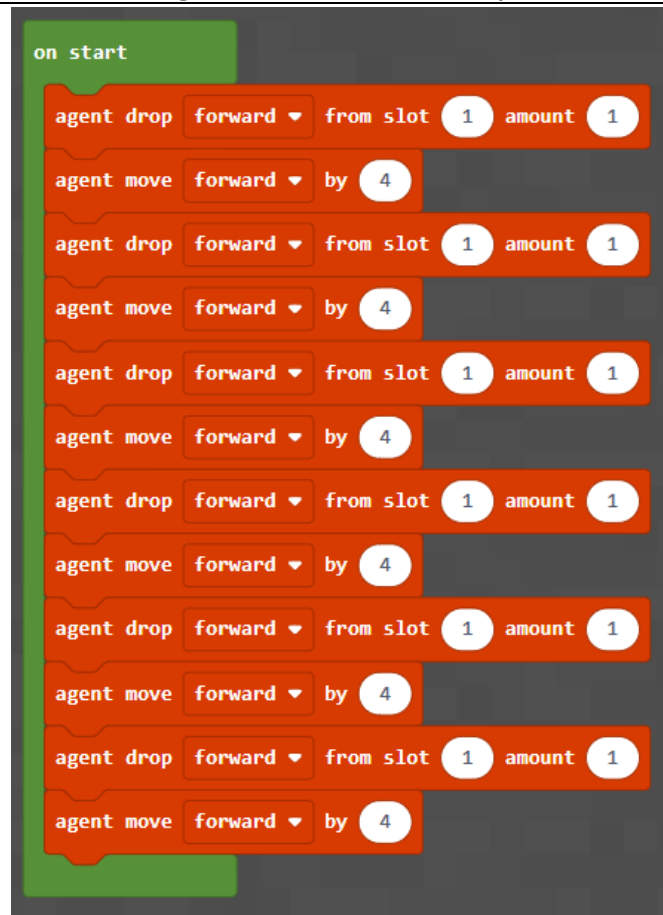
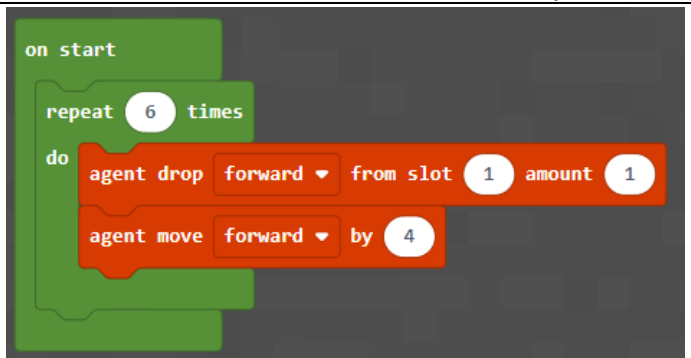| Beginner Solution Example	More Advanced Solution Example

Beginner Solution Example

```
on start
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent move forward by 2
    agent move right by 2
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
    agent move forward by 2
    agent move right by 2
    agent move forward by 1
    agent place down
    agent move forward by 1
    agent place down
```

More Advanced Solution Example

```
on start
    repeat 2 times
    do
        agent move forward by 1
        agent place down
    agent move forward by 2
    agent move right by 2
    repeat 2 times
    do
        agent move forward by 1
        agent place down
    agent move forward by 2
    agent move right by 2
    repeat 2 times
    do
        agent move forward by 1
        agent place down
```

Time Split 7 – First Computer Scientist

Students may discover multiple solutions for this time split and still reach a successful outcome.

Beginner Solution Example	More Advanced Solution Example

on start
agent move forward by 1
agent destroy down
agent move forward by 2
agent destroy down
agent move forward by 2
agent destroy down
agent turn right
agent move forward by 2
agent turn right
agent destroy down
agent move forward by 2
agent destroy down
agent move forward by 2
agent destroy down
	on start
	agent move forward by 1
	agent destroy down
	repeat 2 times
	do
	  agent move forward by 2
	  agent destroy down
	agent turn right
	agent move forward by 2
	agent turn right
	agent destroy down
	repeat 2 times
	do
	  agent move forward by 2
	  agent destroy down

Time Split 8: Human's Best Friends

Students may discover multiple solutions for this time split and still reach a successful outcome.

Beginner Solution Example	More Advanced Solution Example
on start agent drop forward ▼ from slot 1 amount 1 agent move forward ▼ by 4 agent drop forward ▼ from slot 1 amount 1 agent move forward ▼ by 4 agent drop forward ▼ from slot 1 amount 1 agent move forward ▼ by 4 agent drop forward ▼ from slot 1 amount 1 agent move forward ▼ by 4 agent drop forward ▼ from slot 1 amount 1 agent move forward ▼ by 4 agent drop forward ▼ from slot 1 amount 1 agent move forward ▼ by 4	on start repeat 6 times do agent drop forward ▼ from slot 1 amount 1 agent move forward ▼ by 4

Time Split 9: Paleontology Puzzle

Students may discover multiple solutions for this time split and still reach a successful outcome.

Beginner Solution Example	More Advanced Solution Example
on start	on start
agent move forward by 2	repeat 4 times
agent destroy down	do
agent place down	agent move forward by 2
agent move forward by 2	agent destroy down
agent destroy down	agent place down
agent place down	
agent move forward by 2	
agent destroy down	
agent place down	
agent move forward by 2	
agent destroy down	
agent place down	

Time Split 10: Elements of Discovery

Students may discover multiple solutions for this time split and still reach a successful outcome.

Beginner Solution Example	More Advanced Solution Example
	The beginner solution is also the most advanced solution, although please note that students may reach various solutions that still achieve the same outcome.

HOUR OF CODE 2021: CODING SOLUTIONS

(Azure Notebooks Python Code)

The coding solutions shown below provides one beginner and one intermediate solution for each time split. However, students may find multiple solutions which reach the same successful outcome.

For the intermediate code, please note that Python is VERY sensitive to tabs and spaces. All the repeated commands in the "for I in range" loops **<u>MUST</u>** be indented exactly the same. Use one tab to make sure it works rather than multiple spaces on the space bar.

Big Band Jazz

Beginner Code	Intermediate Code
| ```
1    agent.move("forward")
2    agent.move("forward")
3    agent.move("forward")
4    agent.move("up")
5    agent.move("forward")
6    agent.move("forward")
7    agent.move("down")
8    agent.move("down")
9    agent.move("forward")
10   agent.move("forward")
11   agent.move("up")
12   agent.move("up")
13   agent.move("forward")
``` | ```
1    for i in range(3):
2        agent.move("forward")
3    agent.move("up")
4    agent.move("forward")
5    agent.move("forward")
6    agent.move("down")
7    agent.move("down")
8    agent.move("forward")
9    agent.move("forward")
10   agent.move("up")
11   agent.move("up")
12   agent.move("forward")
13
``` |

Pyramids of Giza

Beginner Code	Intermediate Code
| ```python
# code here

agent.give("SANDSTONE", 64, 1)

agent.move("forward")
agent.place(1,"back")

agent.move("forward")
agent.place(1,"back")

agent.move("forward")
agent.place(1,"back")

agent.move("up")
agent.turn("left")
agent.turn("left")
agent.move("forward")
agent.move("forward")

agent.move("forward")
agent.place(1,"back")
``` | ```python
# code here

agent.give("SANDSTONE", 64, 1)

for i in range(3):
    agent.move("forward")
    agent.place(1,"back")

agent.move("up")
agent.turn("left")
agent.turn("left")
agent.move("forward")
agent.move("forward")

agent.move("forward")
agent.place(1,"back")
``` |

Moon Mission

Beginner Code	Intermediate Code
| ```
1   agent.move("forward")
2   agent.move("forward")
3   agent.move("forward")
4   agent.move("forward")
5   agent.move("forward")
6   agent.move("forward")
7   agent.move("forward")
8   agent.move("forward")
9   agent.move("forward")
10  agent.move("forward")
11  agent.move("forward")
12  agent.move("forward")
13  agent.move("forward")
14  agent.move("forward")
15  agent.move("forward")
16  agent.move("forward")
17  agent.move("forward")
18  agent.move("forward")
19  agent.move("forward")
20  agent.move("forward")
21  agent.move("forward")
22  agent.move("forward")
23  agent.move("forward")
24  agent.move("forward")
25  agent.move("forward")
26  agent.turn("right")
27  agent.move("forward")
28  agent.move("forward")
29  agent.move("forward")
30  agent.move("forward")
31  agent.move("forward")
32  agent.move("forward")
33  agent.move("forward")
34  agent.move("forward")
35  agent.move("forward")
36  agent.move("forward")
37  agent.move("forward")
38  agent.move("forward")
39  agent.move("forward")
40  agent.move("forward")
41  agent.move("forward")
42  agent.move("forward")
43  agent.move("forward")
44  agent.move("down")
45  agent.move("down")
46  agent.move("down")
``` | ```
1   # code here
2
3   for i in range(25):
4       agent.move("forward")
5   agent.turn("right")
6
7   for i in range(17):
8       agent.move("forward")
9
10  for i in range(3):
11      agent.move("down")
12
``` |

The Great Wall of China

Beginner Code	Intermediate Code
| ```
1   agent.give("bamboo", 64,1)
2   agent.move("forward")
3   agent.place(1, "back")
4   agent.move("forward")
5   agent.place(1, "back")
6   agent.move("forward")
7   agent.place(1, "back")
8   agent.move("forward")
9   agent.place(1, "back")
10  agent.move("forward")
11  agent.place(1, "back")
12
``` | ```
1   # code here
2
3   agent.give("BAMBOO", 64, 1)
4   for i in range(5):
5       agent.place(1,"down")
6       agent.move("forward")
``` |

The Mona Lisa

Beginner Code	Intermediate Code

```
1    # code here
2
3    agent.give("WHITE GLAZED TERRACOTTA", 64, 1)
4
5    agent.move("forward")
6    agent.place(1,"down")
7    gent.move("forward")
8    agent.place(1,"down")
9    gent.move("forward")
10   agent.place(1,"down")
11   gent.move("forward")
12   agent.place(1,"down")
13   gent.move("forward")
14   agent.place(1,"down")
15
16   agent.turn("right")
17
18   agent.move("forward")
19   agent.place(1,"down")
20   gent.move("forward")
21   agent.place(1,"down")
22   gent.move("forward")
23   agent.place(1,"down")
24   gent.move("forward")
25   agent.place(1,"down")
26   gent.move("forward")
27   agent.place(1,"down")
```

```
1    # code here
2
3    agent.give("WHITE GLAZED TERRACOTTA", 64, 1)
4
5    for i in range(5):
6        agent.move("forward")
7        agent.place(1,"down")
8
9    agent.turn("right")
10
11   for i in range(5):
12       agent.move("forward")
13       agent.place(1,"down")
```

First Flights

Beginner Code	Intermediate Code
| ```python
# code here

agent.give("DIRT", 64, 1)

agent.move("forward")
agent.place(1,"down")
agent.move("forward")
agent.place(1,"down")


agent.move("forward")
agent.move("forward")
agent.move("right")
agent.move("right")

agent.move("forward")
agent.place(1,"down")
agent.move("forward")
agent.place(1,"down")

agent.move("forward")
agent.move("forward")
agent.move("right")
agent.move("right")

agent.move("forward")
agent.place(1,"down")
agent.move("forward")
agent.place(1,"down")
``` | ```python
# code here

agent.give("DIRT", 64, 1)
for i in range(2):
    agent.move("forward")
    agent.place(1,"down")

agent.move("forward")
agent.move("forward")
agent.move("right")
agent.move("right")

for i in range(2):
    agent.move("forward")
    agent.place(1,"down")

agent.move("forward")
agent.move("forward")
agent.move("right")
agent.move("right")

for i in range(2):
    agent.move("forward")
    agent.place(1,"down")
``` |

First Computer Scientist

Beginner Code	Intermediate Code
| ```
1    # code here
2
3    agent.move("forward")
4    agent.destroy("down")
5    agent.move("forward")
6    agent.move("forward")
7    agent.destroy("down")
8    agent.move("forward")
9    agent.move("forward")
10   agent.destroy("down")
11   agent.turn("right")
12   agent.move("forward")
13   agent.move("forward")
14   agent.turn("right")
15   agent.destroy("down")
16   agent.move("forward")
17   agent.move("forward")
18   agent.destroy("down")
19   agent.move("forward")
20   agent.move("forward")
21   agent.destroy("down")
``` | Because of the less predictable movements in this time split, a straight sequence is advisable, as in the Beginner Code. |

Human's Best Friends

Beginner Code	Intermediate Code
| ```
1   # code here
2
3   agent.give("BEETROOT", 64, 1)
4
5   agent.drop(1,1)
6   agent.move("forward")
7   agent.move("forward")
8   agent.move("forward")
9   agent.move("forward")
10
11  agent.drop(1,1)
12  agent.move("forward")
13  agent.move("forward")
14  agent.move("forward")
15  agent.move("forward")
16
17  agent.drop(1,1)
18  agent.move("forward")
19  agent.move("forward")
20  agent.move("forward")
21  agent.move("forward")
22
23  agent.drop(1,1)
24  agent.move("forward")
25  agent.move("forward")
26  agent.move("forward")
27  agent.move("forward")
28
29  agent.drop(1,1)
30  agent.move("forward")
31  agent.move("forward")
32  agent.move("forward")
33  agent.move("forward")
34
35  agent.drop(1,1)
36  agent.move("forward")
37  agent.move("forward")
38  agent.move("forward")
39  agent.move("forward")
``` | ```
1   # code here
2
3   agent.give("BEETROOT", 64, 1)
4   for i in range(6):
5       agent.drop(1,1)
6       agent.move("forward")
7       agent.move("forward")
8       agent.move("forward")
9       agent.move("forward")
``` |

Paleontology Puzzle

Beginner Code	Intermediate Code

<pre>1   # code here
2
3   agent.give("BONEBLOCK", 64, 1)
4
5   agent.move("forward")
6   agent.move("forward")
7   agent.destroy("down")
8   agent.place(1,"down")
9
10   agent.move("forward")
11   agent.move("forward")
12   agent.destroy("down")
13   agent.place(1,"down")
14
15   agent.move("forward")
16   agent.move("forward")
17   agent.destroy("down")
18   agent.place(1,"down")
19
20   agent.move("forward")
21   agent.move("forward")
22   agent.destroy("down")
23   agent.place(1,"down")</pre>
	<pre>1 # code here
	2
	3 agent.give("BONEBLOCK", 64, 1)
	4
	5 for i in range(4):
	6 agent.move("forward")
	7 agent.move("forward")
	8 agent.destroy("down")
	9 agent.place(1,"down")</pre>

Elements of Discovery

Beginner Code	Intermediate Code
| ```
1    # code here
2
3    agent.move("up")
4
5    agent.move("forward")
6    agent.move("forward")
7    agent.move("forward")
8    agent.move("forward")
9
10   agent.destroy("left")
``` | ```
1    # code here
2
3    agent.move("up")
4
5    for i in range (4):
6        agent.move("forward")
7
8    agent.destroy("left")
``` |