따끈따끈 베이커리

사물인터넷 캡스톤디자인(7)

담당교수	노광현 교수님		
팀 명	장별섭		
팀 원	1771138 신정섭	1791285 장수영	1771358 박별하

❑ 주제 (개발기술 개요 및 필요성)

❍ 베이커리 작업환경 개선 IoT 시스템

- 중/소규모 음식점 및 제빵 업을 영위하는 사업자들은 냉장기기 및 오븐 등의 설비기기를 사용하여 재료 보관과 조리 등에 활용하고 있으나, 냉장고나 오븐과 같은 대부분의 영업용 설비기기는 원기능에 충실하게 개발되었기 때문에 기기의 상태 정보를 제공하거나 외부에서 동작 제어를 할 수 있는 기능들이 포함되어 있지 않다.

- 냉장고의 경우 정전, 고장 및 문 열림 등으로 내부 온도에 변화가 발생되었으나, 이러한 상황을 운영자에게 자동으로 통보할 수 없어 재료가 손상되는 경우가 발생하는 피해가 있으며, 제빵점의 오븐은 반죽 된 재료 숙성을 위해 미리 오븐에서 작업해야 하는데, 이른 시간이나 주말에 작업해야 하는 등의 운영자의 피로도를 증가시키는 요인이 되고 있다.

- 일부 고가의 제품에는 이러한 기능이 포함되어 있기도 하지만, 영세한 소상공인과 자영업자는 저렴한 제품 또는 중고제품을 구매하여 운영하는 경우가 많기에 이러한 영업용 냉장기기 및 설비기기들의 특성을 파악하여 손쉬운 장착으로 제어할 수 있어야 하며, 저렴한 가격으로 구매할 수 있도록 제품 개발을 할 필요가 있다.

- 음식점 및 제과·제빵점에 있는 냉장기기 및 오븐 등의 기기를 아두이노와 웹 페이지를 통해 에어컨, 환풍기 및 오븐의 온습도와 On/Off 제어하는 기능을 구현하고, 웹 카메라를 이용해 웹 페이지에서 모니터링하며 IR 적외선 리모컨 및 웹 앱으로 외부에서 원격제어하는 시스템이다.

- 이 주제는 IT 중소기업인 ㈜윅스콘에서 소상공 베이커리 매장에 실제 적용할 IoT 시스템 개발을 위해 제안한 주제이다.

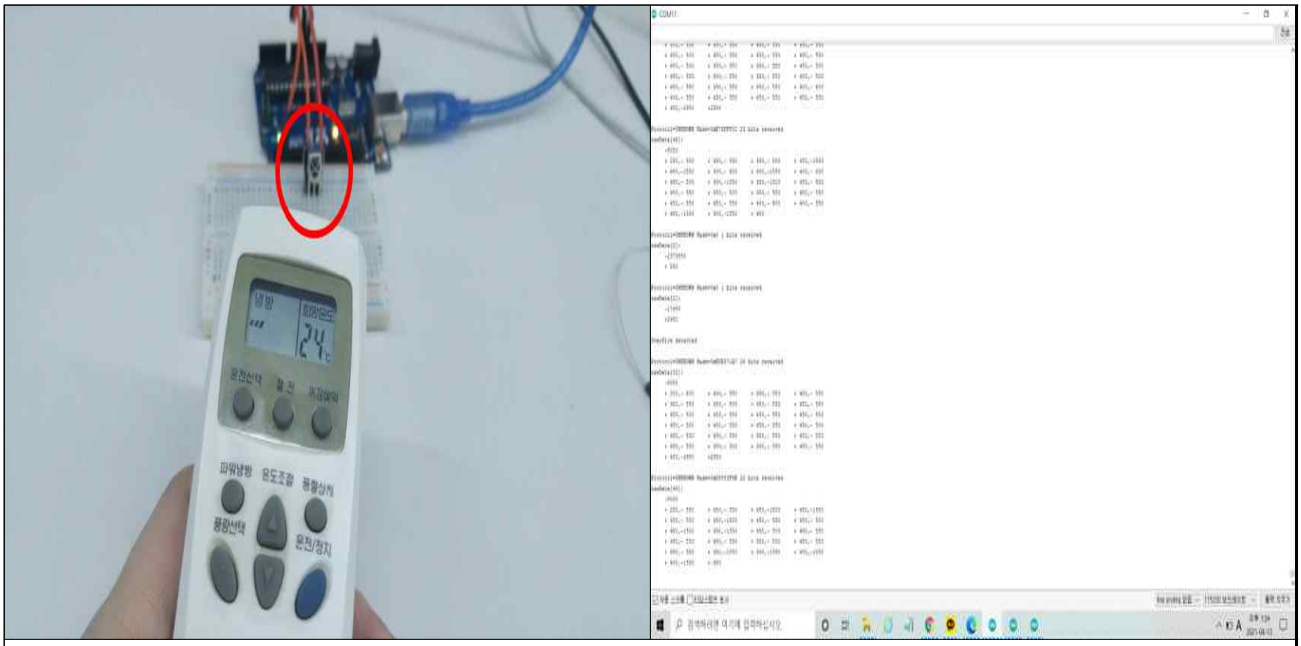
❍ 개발기술의 차별성

- 음식점 및 제과·제빵점에 있는 냉장기기 및 오븐 등의 기기를 웹이나 앱을 통해 에어컨, 환풍기, 오븐의 온도조절과 전원을 제어하는 기능은 존재하지만, LG나 삼성 같은 대기업의 제품을 필히 구매하여 사용해야 된다는 단점이 있습니다. 저희 프로젝트는 원래 가게에서 기존에 사용하던 에어컨이나 환풍기, 오븐에 단순히 아두이노를 부착하여 연결하는 것만으로 기기들을 원격 제어하고 관리할 수 있다는 점에 차별성을 두었습니다.

❑ 주요기능

❍ Wi-Fi 에어컨 제어장치

- 수신 모듈을 이용하여 제조사별로 전원 및 온도별 버튼 RAW_DATA 조사
- ESP-01을 이용하여 웹페이지(HTML)에서 원하는 데이터를 받았을 때 그 데이터에 맞는 RAW_DATA를 송신 모듈을 이용하여 데이터를 전송한다.



적외선 수신 모듈을 이용하여 버튼별 코드 수집 하는 사진

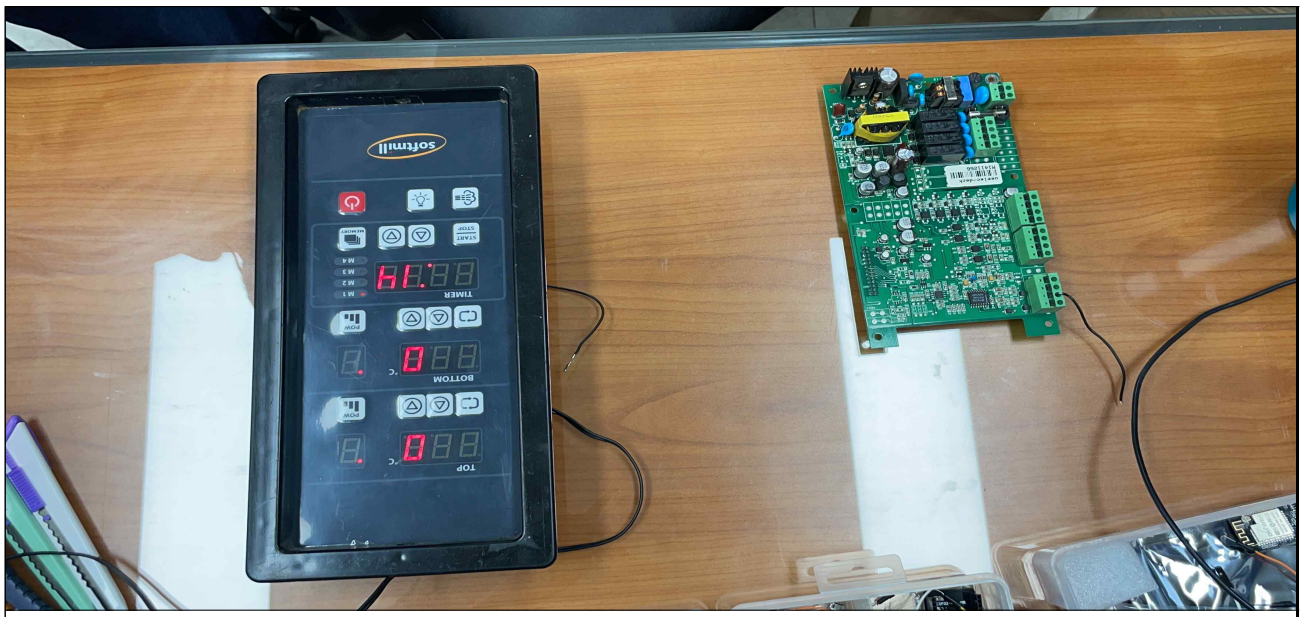
❍ 환풍기 제어

- 릴레이 모듈을 이용하여 220V 환풍기와 연결시킨다.
- ESP-01을 이용하여 웹페이지(HTML)에서 원하는 데이터를 받았을 때 HIGH, LOW 데이터를 전송한다.

환풍기 원격제어 사진

❍ Wi-Fi 오븐 제어장치

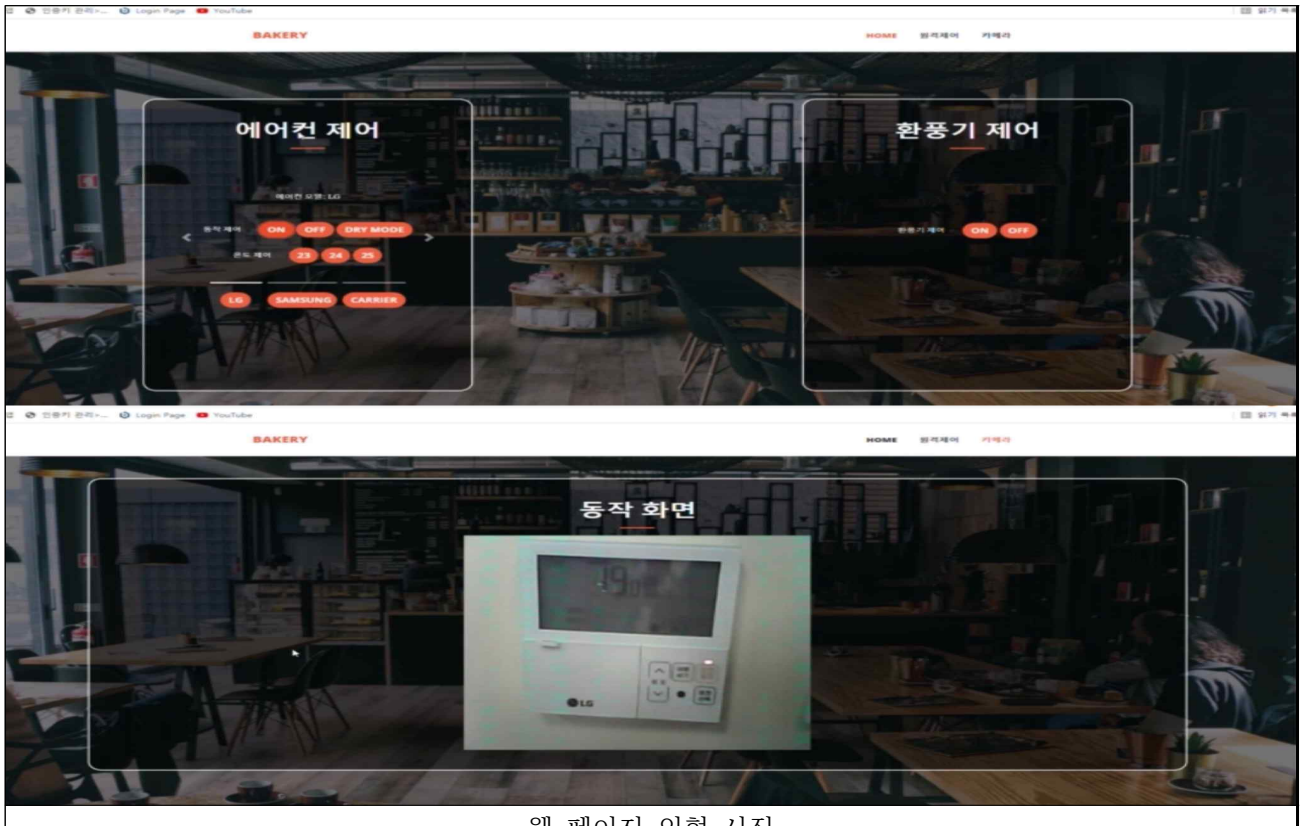
- 수신 모듈을 이용하여 제조사별로 전원 및 온도별 버튼 RAW_DATA 조사
- ESP-01을 이용하여 웹페이지(HTML)에서 원하는 데이터를 받았을 때 그 데이터에 맞는 RAW_DATA를 송신 모듈을 이용하여 데이터를 전송한다.



오븐 원격제어 사진

❍ Wi-Fi 덕트 제어장치 (웹 페이지)

- 에어컨, 환풍기 및 오븐을 제어할 수 있는 버튼 제작, 버튼 클릭 시 원격제어.
- ESP32-CAM을 이용하여 웹 페이지에 현재 기기의 동작 중인 상태 정보가 확인이 가능하다.



웹 페이지 외형 사진

❑ 기대효과

❍ 저렴한 가격

- 최대한 저렴한 모듈을 이용하여 원가를 낮춰 소상공인, 자영업자들이 다른 기업의 제품들 보다 저렴한 가격으로 구매할 수 있다.

❍ 편리성 증진

- 리모컨을 통해 직접 제어를 하는 것보다, 웹 페이지를 이용해 제어를 하게 되어 사용자의 피로도를 줄일 수 있으며 편리성을 증진 시킬 수 있다.

❑ 최종 결과물

❍ 시연 영상 및 깃허브 주소

- https://youtu.be/HAyYdnkyKbo
- https://github.com/JeongSeopShin/Aircontrol_IR-protocol

❑ 팀원 참여 기여도 비율

❍ 장수영, 박별하 (각 33.3%)

- IR 수신 모듈을 이용하여 각 제조사 리모컨 별로 버튼마다 RAW_DATA 조사
- IR 송신 모듈을 이용하여 RAW_DATA 전송 시 에어컨 동작 제어 확인
- Arduino 보다 작은 보드인 NANO 33 IoT 보드를 이용하여 Wi-Fi 통신으로도 원격 제어 되는지 테스트
- 릴레이와 220V 상업용 환풍기 연결 조립 및 동작 제어 확인
- 모듈 외형 제작 및 시연 영상 촬영
- 시연 영상 및 최종 발표 자료 제작, 주차별 보고서 작성

❍ 신정섭 (33.3%)

- 원격 제어를 하는 웹 페이지를 부트스트랩 및 js를 이용하여 제작 (HTML)
- ESP01 모듈을 이용하여 아두이노와 HTML 연동 후 웹 페이지와 통신하고, 원하는 데이터를 받았을 때 송신 모듈에서 RAW_DATA를 전송하는 기능 구현
- 실제로 웹 페이지에서 버튼을 클릭하면 아두이노로 원하는 데이터가 전송되어 아두이노가 인식해 원격제어하는 데이터를 기기에게 전송하는 원리
- ESP32-CAM을 이용하여 웹 페이지에서 현재 기기의 상태 정보를 확인할 수 있는 페이지 제작
- 주차별 보고서 및 최종 보고서 작성

❑ 장수영, 박별하가 수행한 내용

❍ 에어컨 제조사별 전원 온오프, 냉방/제습별 온도 코드 (raw_data) 수집 후 정리한 내용

SAMSUNG

SAMSUNG

코드	23℃	24℃	25℃	26℃
RAW_DATA	498, 18016, 2913, 9054, 408, 615, 380, 1582, 408, 615, 380, 615, 379, 616, 380, 614, 381, 614, 381, 615, 380, 591, 404, 1584, 406, 590, 405, 590, 405, 1611, 379, 642, 353, 642, 353, 1611, 405, 1585, 406, 1585, 406, 1585, 405, 1585, 406, 1584, 406, 615, 380, 615, 380, 590, 405, 590, 405, 590, 405, 590, 405, 615, 380, 642, 353, 642, 353, 642, 353, 642, 378, 617, 379, 616, 380, 615, 380, 615, 380, 615, 380, 618, 377, 615, 380, 615, 380, 591, 405, 590, 405, 590, 405, 590, 405, 591, 404, 615, 380, 642, 353, 642, 353, 642, 353, 642, 378, 617, 379, 616, 379, 616, 380, 1585, 405, 1585, 405, 1585, 405, 1584, 406, 3091, 2880, 9060, 405, 1585, 405, 642, 353, 642, 353, 642, 353, 642, 377, 618, 378, 617, 379, 616, 380, 615, 380, 1610, 380, 615, 380, 615, 380, 1585, 405, 590, 405, 1586, 404, 1637, 353, 1637, 353, 1637, 378, 617, 379, 616, 379, 616, 380, 615, 380, 615, 380, 615, 380, 615, 380, 591, 404, 591, 404, 590, 405, 591, 404, 591, 405, 642, 352, 643, 353, 642, 352, 1638, 377, 1613, 378, 1612, 379, 616, 379, 1611, 379, 616, 379, 616, 379, 616, 379, 1586, 404, 591, 405, 591, 403, 616,	404, 616, 379, 642, 354, 1612, 378, 1612, 404, 1586, 404, 1586, 405, 3092, 2879, 9084, 380, 1610, 380, 615, 380, 591, 404, 590, 405, 590, 405, 591, 404, 592, 403, 642, 353, 642, 353, 1637, 378, 617, 379, 616, 379, 616, 380, 1610, 380, 1610, 380, 615, 380, 1610, 379, 1586, 405, 1585, 405, 1586, 404, 616, 379, 642, 353, 642, 353, 642, 378, 617, 378, 618, 378, 617, 379, 616, 380, 615, 380, 615, 380, 616, 379, 616, 379, 591, 404, 591, 404, 592, 403, 617, 378, 1639, 351, 1638, 377, 618, 378, 617, 379, 616, 380, 1611, 379, 615, 380, 616, 379, 616, 379, 616, 379, 616, 379, 592, 404, 1611, 379, 1638, 352, 1638, 352, 1638, 379, 1000	498, 18007, 2887, 9053, 411, 587, 407, 1581, 408, 641, 353, 642, 353, 642, 378, 617, 378, 617, 379, 616, 380, 615, 381, 1584, 406, 615, 380, 615, 380, 1584, 406, 615, 380, 590, 405, 1585, 406, 1584, 406, 1611, 379, 1611, 402, 1588, 405, 616, 379, 616, 380, 615, 380, 615, 380, 615, 380, 615, 380, 615, 380, 591, 404, 590, 405, 591, 405, 590, 405, 591, 404, 644, 351, 642, 353, 642, 377, 618, 378, 617, 379, 616, 380, 615, 380, 616, 380, 615, 380, 615, 380, 615, 380, 615, 380, 615, 380, 591, 404, 590, 405, 591, 404, 591, 405, 591, 404, 642, 353, 1612, 378, 1612, 403, 1587, 404, 1586, 405, 3091, 2880, 9061, 404, 1610, 381, 615, 380, 615, 380, 590, 405, 590, 405, 590, 405, 591, 404, 615, 380, 642, 353, 1637, 352, 643, 377, 618, 378, 1612, 379, 616, 380, 1610, 380, 615, 380, 1610, 380, 1585, 405, 1586, 404, 1586, 404, 592, 404, 642, 353, 642, 353, 642, 353, 642, 377, 618, 379, 616, 379, 616, 380, 616, 379, 616, 379, 616, 380, 615, 380, 615, 380, 590, 405, 590, 405, 1585, 405, 1586, 404, 1637, 353, 1638, 377, 618, 378, 617, 379, 616, 379, 1611, 379, 616, 379, 616, 380, 615, 379, 1611, 379, 616, 379, 616, 380, 615,	522, 17980, 2914, 9053, 411, 588, 406, 1581, 408, 640, 354, 641, 353, 642, 378, 617, 379, 616, 380, 591, 404, 615, 381, 1583, 407, 614, 381, 614, 381, 1584, 406, 590, 405, 590, 405, 1584, 406, 1585, 405, 1611, 379, 1610, 404, 1586, 405, 592, 404, 615, 380, 615, 380, 591, 405, 614, 381, 615, 380, 615, 380, 591, 404, 590, 405, 590, 405, 590, 405, 591, 404, 591, 404, 617, 378, 642, 353, 642, 377, 594, 402, 593, 403, 616, 380, 615, 381, 614, 381, 615, 380, 615, 380, 615, 380, 615, 380, 615, 380, 590, 405, 590, 405, 591, 404, 591, 404, 591, 405, 617, 377, 1612, 379, 1611, 404, 1586, 405, 1585, 405, 3091, 2881, 9059, 405, 1585, 405, 615, 380, 590, 405, 590, 405, 590, 405, 591, 404, 590, 405, 615, 380, 617, 378, 1612, 378, 618, 402, 617, 379, 1611, 380, 615, 380, 1611, 380, 615, 380, 1586, 404, 1585, 405, 1585, 405, 1585, 405, 591, 404, 618, 377, 642, 353, 642, 353, 642, 378, 617, 379, 616, 379, 616, 380, 615, 380, 615, 380, 615, 380, 615, 380, 591, 404, 591, 404, 591, 404, 1586, 404, 642, 353, 1638, 352, 1638, 377, 617, 379, 616, 380, 615, 380, 1610, 380, 615, 380, 615, 380, 616,

□ SAMSUNG은 따로 ON / OFF 코드가 없으며, 온도 코드를 보내면 해당 온도로 에어컨이 켜진다.

LG

LG

코드	ON	OFF	제습모드	23℃
RAW_DATA	3115, 9947, 453, 1638, 426, 611, 424, 611, 424, 611, 424, 1652, 427, 618, 425, 643, 400, 635, 400, 636, 399, 636, 399, 636, 400, 626, 425, 626, 424, 636, 400, 643, 399, 644, 399, 637, 398, 1669, 425, 636, 398, 645, 397, 639, 396, 639, 395, 1690, 396, 641, 394, 625, 418, 1675, 420, 1658, 421, 640, 394, 1000	3088, 9927, 450, 1647, 425, 611, 425, 611, 424, 612, 423, 1645, 426, 627, 424, 645, 398, 638, 426, 1625, 453, 1616, 454, 609, 426, 617, 426, 609, 426, 609, 428, 607, 426, 609, 425, 610, 425, 611, 397, 628, 448, 613, 396, 639, 396, 1667, 419, 640, 394, 1692, 394, 642, 393, 642, 394, 641, 394, 1685, 394, 1000	3064, 9968, 427, 1658, 425, 637, 398, 620, 423, 645, 398, 1651, 428, 637, 398, 637, 399, 619, 423, 645, 398, 638, 398, 620, 423, 637, 398, 1644, 427, 628, 423, 645, 398, 1652, 427, 1652, 426, 620, 423, 1662, 424, 637, 398, 629, 421, 622, 421, 622, 420, 641, 394, 632, 418, 651, 392, 1686, 393, 1668, 418, 1000	3091, 9955, 451, 1639, 425, 612, 423, 612, 423, 612, 423, 1661, 426, 612, 423, 637, 398, 638, 398, 619, 424, 644, 399, 638, 398, 619, 423, 1653, 426, 637, 398, 645, 398, 645, 398, 1654, 425, 637, 398, 628, 422, 638, 397, 630, 421, 630, 420, 1674, 396, 640, 394, 650, 393, 650, 394, 1675, 419, 649, 394, 1000

24℃	25℃	26℃
3066, 9954, 425, 1637, 446, 620, 423, 628, 424, 627, 424, 1639, 447, 620, 423, 645, 398, 637, 399, 619, 423, 637, 399, 645, 398, 645, 398, 1633, 445, 638, 398, 628, 423, 628, 423, 1653, 425, 645, 398, 638, 397, 1662, 423, 646, 396, 648, 395, 1665, 421, 632, 418, 632, 418, 643, 393, 1659, 419, 1676, 394, 1000	3092, 9954, 451, 1639, 425, 612, 424, 612, 423, 612, 423, 1661, 426, 611, 424, 637, 398, 637, 399, 619, 423, 645, 398, 638, 398, 620, 423, 1652, 427, 637, 398, 645, 398, 645, 398, 1653, 425, 638, 398, 1669, 424, 638, 397, 621, 421, 647, 395, 1675, 395, 641, 394, 649, 393, 1677, 394, 650, 393, 650, 393, 1000	3065, 10006, 425, 1638, 445, 612, 423, 613, 423, 620, 424, 1670, 424, 620, 423, 628, 424, 627, 423, 639, 396, 638, 398, 628, 423, 645, 398, 1634, 445, 620, 423, 619, 424, 637, 398, 1646, 424, 629, 422, 1670, 424, 1671, 422, 648, 395, 623, 420, 1657, 420, 641, 394, 642, 393, 1677, 394, 633, 418, 1675, 419, 1000

CARRIER

CARRIER

코드	ON	OFF	제습모드	23℃	24℃	25℃	26℃
RAW_DATA	4321, 4511, 456, 1699, 456, 625, 452, 1699, 457, 1699, 457, 649, 428, 649, 429, 1699, 457, 649, 428, 650, 428, 1699, 457, 649, 433, 645, 428, 1700, 455, 1701, 455, 649, 428, 1701, 454, 1702, 475, 629, 448, 1706, 450, 1706, 448, 1708, 448, 1708, 447, 1708, 447, 1708, 448, 631, 447, 1707, 448, 630, 447, 631, 447, 631, 447, 630, 447, 631, 447, 631, 447, 630, 447, 1708, 448, 1708, 447, 631, 447, 630, 448, 630, 447, 631, 447, 1708, 448, 630, 447, 631, 447, 1708, 448, 1708, 447, 1709, 447, 1708, 447, 5309, 4312, 4520, 447, 1709, 447, 631, 447, 1708, 447, 1709, 447, 631, 447, 630, 447, 1708, 448, 630, 447, 631, 447, 1708, 447, 631, 447, 631, 446, 1708, 448, 1708, 447, 631, 447, 1708, 447, 1708, 447, 631, 447, 1709, 446, 1709, 447, 1708, 447, 1709, 447, 631, 447, 1708, 447, 631, 447, 631, 447, 630, 447, 631, 447, 1709, 447, 1708, 447, 631, 447, 631, 447, 1709, 446, 632, 446, 631, 447, 631, 447, 1709, 447, 1709, 446, 1709, 447, 1709, 447, 1000	4323, 4538, 429, 1726, 429, 650, 428, 1726, 430, 1726, 429, 650, 428, 650, 428, 1725, 430, 650, 428, 649, 428, 1699, 457, 649, 428, 649, 428, 1726, 429, 651, 427, 1727, 451, 1705, 450, 1706, 449, 1706, 449, 656, 422, 1708, 448, 1708, 448, 1708, 447, 656, 422, 632, 446, 632, 446, 631, 447, 1708, 448, 632, 446, 631, 446, 1708, 447, 1709, 447, 1709, 448, 655, 422, 632, 446, 632, 446, 632, 446, 632, 446, 631, 446, 632, 446, 1708, 447, 1708, 448, 1708, 448, 1708, 448, 1708, 447, 1709, 447, 5310, 4313, 4520, 447, 1708, 447, 632, 446, 1709, 447, 1708, 447, 632, 446, 631, 447, 1709, 446, 632, 446, 632, 446, 1709, 446, 632, 446, 632, 446, 1709, 446, 1710, 446, 632, 445, 1711, 445, 656, 422, 1733, 422, 1734, 422, 1734, 422, 1734, 422, 1734, 421, 657, 421, 1734, 422, 1734, 421, 1734, 422, 656, 421, 657, 421, 656, 422, 656, 422, 1734, 421, 657, 421, 657, 421, 1735, 421, 1734, 421, 657, 421, 656, 422, 656, 422, 656, 421, 657, 421, 657, 421, 657, 421, 1735, 421, 1734, 421, 1735, 421, 1735, 421, 1735, 421, 1000	4325, 4510, 456, 1696, 459, 650, 428, 1697, 458, 1726, 429, 650, 428, 650, 428, 1726, 429, 650, 428, 649, 428, 1726, 429, 650, 428, 649, 428, 1726, 430, 1725, 430, 649, 428, 1726, 429, 650, 449, 629, 448, 630, 447, 1706, 450, 1706, 448, 1708, 447, 1709, 447, 1708, 448, 1708, 447, 1707, 448, 1708, 447, 632, 445, 656, 422, 656, 422, 632, 445, 632, 446, 632, 445, 633, 445, 1708, 447, 656, 422, 632, 445, 1708, 447, 656, 422, 631, 446, 1709, 447, 1708, 447, 632, 445, 1709, 447, 1708, 447, 632, 446, 1709, 447, 5310, 4312, 4520, 446, 1709, 446, 632, 446, 1709, 446, 1709, 446, 632, 446, 632, 446, 1709, 446, 632, 445, 633, 445, 1709, 446, 1710, 446, 632, 445, 1710, 445, 656, 422, 632, 445, 633, 446, 1709, 445, 1710, 446, 1710, 445, 1710, 446, 1710, 446, 1733, 422, 1710, 445, 1734, 421, 657, 421, 657, 421, 656, 421, 656, 421, 657, 421, 657, 421, 656, 422, 656, 421, 657, 421, 1734, 421, 1734, 421, 657, 421, 1735, 420, 1734, 422, 656, 421, 1735, 421, 1734, 421, 1000	4322, 4511, 455, 1700, 456, 624, 453, 1699, 457, 1699, 457, 649, 429, 649, 428, 1699, 457, 649, 428, 650, 428, 1699, 456, 650, 428, 649, 428, 1700, 455, 1700, 456, 649, 428, 1701, 454, 1703, 452, 651, 449, 1706, 449, 1707, 449, 1707, 448, 1707, 448, 1708, 448, 1707, 448, 630, 448, 1708, 447, 631, 447, 630, 448, 630, 447, 631, 447, 630, 447, 631, 447, 1708, 448, 630, 447, 1708, 448, 630, 447, 631, 447, 1708, 447, 631, 447, 1708, 448, 1708, 447, 1709, 447, 1708, 447, 5310, 4313, 4519, 447, 1708, 447, 631, 447, 1708, 448, 1708, 447, 631, 447, 631, 447, 1709, 447, 631, 447, 631, 447, 1708, 447, 631, 447, 630, 448, 630, 448, 1708, 447, 631, 447, 1708, 447, 1708, 447, 1709, 446, 1709, 446, 1709, 447, 1708, 447, 1709, 446, 631, 447, 631, 447, 631, 447, 631, 446, 631, 447, 631, 447, 631, 447, 631, 446, 1709, 447, 631, 446, 631, 447, 631, 447, 1709, 447, 631, 446, 1709, 446, 632, 446, 1709, 447, 1709, 446, 1710, 446, 1709, 446, 1000	4320, 4511, 456, 1699, 456, 624, 454, 1699, 456, 1699, 457, 650, 428, 649, 428, 1699, 457, 650, 428, 649, 429, 1698, 457, 649, 429, 649, 428, 1700, 456, 1700, 455, 649, 428, 1701, 477, 1679, 452, 652, 449, 1682, 473, 1706, 449, 1706, 448, 1708, 447, 1708, 448, 1707, 448, 631, 447, 1708, 447, 631, 447, 631, 447, 630, 447, 631, 447, 631, 447, 630, 447, 631, 447, 1708, 447, 631, 447, 630, 447, 631, 447, 631, 447, 630, 448, 630, 447, 1708, 448, 630, 447, 1708, 448, 630, 447, 1709, 447, 1708, 447, 1709, 447, 1708, 448, 1708, 447, 5309, 4313, 4519, 448, 1708, 447, 631, 447, 1708, 447, 1708, 448, 630, 448, 630, 448, 1707, 448, 630, 447, 1707, 448, 630, 447, 631, 447, 1708, 448, 1708, 447, 631, 447, 1708, 447, 631, 447, 631, 447, 1708, 447, 1708, 447, 631, 447, 1708, 447, 631, 447, 631, 447, 631, 446, 631, 447, 631, 447, 631, 447, 631, 447, 1708, 447, 631, 447, 631, 447, 631, 447, 1709, 446, 1709, 446, 1709, 447, 1714, 441, 1000	4372, 4459, 508, 1648, 480, 626, 451, 1675, 481, 1675, 480, 625, 453, 625, 479, 1649, 507, 598, 479, 599, 452, 1678, 478, 625, 452, 626, 452, 1677, 479, 1677, 484, 620, 451, 1679, 477, 1680, 475, 628, 450, 1704, 450, 1706, 449, 1707, 449, 1707, 448, 1708, 448, 1707, 448, 630, 448, 1708, 448, 630, 448, 630, 448, 629, 448, 630, 448, 630, 448, 630, 448, 1707, 448, 1708, 448, 630, 448, 629, 448, 630, 448, 630, 448, 630, 448, 1708, 448, 1708, 447, 1713, 443, 1708, 447, 1709, 447, 1708, 448, 5310, 4314, 4520, 447, 1709, 447, 631, 446, 1709, 447, 1709, 446, 632, 446, 632, 446, 1709, 447, 631, 447, 631, 447, 1709, 447, 631, 447, 631, 447, 631, 447, 1709, 447, 1709, 446, 1710, 446, 1709, 447, 631, 447, 1709, 446, 1710, 446, 632, 446, 632, 446, 632, 446, 1710, 445, 1710, 446, 632, 446, 632, 445, 632, 446, 632, 446, 1710, 446, 1710, 446, 1710, 446, 1710, 445, 1000	4372, 4459, 508, 1648, 480, 626, 451, 1675, 481, 1675, 480, 625, 453, 625, 479, 1649, 507, 598, 479, 599, 452, 1678, 478, 625, 452, 626, 452, 1677, 479, 1677, 484, 620, 451, 1679, 477, 1680, 475, 628, 450, 1704, 450, 1706, 449, 1707, 449, 1707, 448, 1708, 448, 1707, 448, 630, 448, 1708, 448, 630, 448, 630, 448, 629, 448, 630, 448, 630, 448, 630, 448, 1707, 448, 1708, 448, 630, 448, 629, 448, 630, 448, 630, 448, 630, 448, 1708, 448, 1708, 447, 1713, 443, 1708, 447, 1709, 447, 1708, 448, 5310, 4314, 4520, 447, 1709, 447, 631, 446, 1709, 447, 1709, 446, 632, 446, 632, 446, 1709, 447, 631, 447, 631, 447, 1709, 447, 631, 447, 631, 447, 631, 447, 1709, 447, 1709, 446, 1710, 446, 1709, 447, 631, 447, 1709, 446, 1710, 446, 632, 446, 632, 446, 632, 446, 1710, 445, 1710, 446, 632, 446, 632, 445, 632, 446, 632, 446, 632, 446, 632, 446, 1710, 446, 1710, 446, 1710, 446, 1710, 445, 1000

❍ IR 수신 모듈을 이용하여 각 에어컨 제조사 리모컨 별 버튼마다 RAW_DATA 조사 코드

```
/* rawR&cv.ino Example sketch for IRLib2
 *  Illustrate how to capture raw timing values for an unknow protocol.
 *  You will capture a signal using this sketch. It will output data the
 *  serial monitor that you can cut and paste into the "rawSend.ino"
 *  sketch.
 */
// Recommend only use IRLibRecvPCI or IRLibRecvLoop for best results
#include <IRLibRecvPCI.h>

IRrecvPCI myReceiver(2);//pin number for the receiver

void setup() {
  Serial.begin(9600);
  delay(2000); while (!Serial); //delay for Leonardo
  myReceiver.enableIRIn(); // Start the receiver
  Serial.println(F("Ready to receive IR signals"));
  myReceiver.setFrameTimeout(100000);
}

void loop() {
  //Continue looping until you get a complete signal received
  if (myReceiver.getResults()) {
    Serial.println(F("Do a cut-and-paste of the following lines into the "));
    Serial.println(F("designated location in rawSend.ino"));
    Serial.print(F("\n#define RAW_DATA_LEN "));
    Serial.println(recvGlobal.recvLength,DEC);
    Serial.print(F("uint16_t rawData[RAW_DATA_LEN]={\n\t"));
    for(bufIndex_t i=1;i<recvGlobal.recvLength;i++) {
      Serial.print(recvGlobal.recvBuffer[i],DEC);
      Serial.print(F(", "));
      if( (i % 8)==0) Serial.print(F("\n\t"));
    }
    Serial.println(F("1000};"));//Add arbitrary trailing space
    myReceiver.enableIRIn();       //Restart receiver
  }
}
```

❍ IR 송신 모듈을 이용하여 RAW_DATA 전송 시 에어컨 동작 제어 확인 코드

```
#include <IRLibSendBase.h>      // 헤더파일
#include <IRLib_HashRaw.h>

IRsendRaw mySender;
```

```
void setup() {
  Serial.begin(9600);
  delay(2000);
}

// LG 에어컨 제어 코드
 #define RAW_DATA_LEN 60
uint16_t rawDataOn[RAW_DATA_LEN]={
 3069, 9975, 445, 1659, 424, 645, 399, 636,
  399, 637, 398, 1643, 428, 637, 398, 637,
  398, 645, 399, 644, 399, 637, 398, 645,
  399, 619, 424, 644, 399, 636, 400, 644,
  399, 627, 424, 636, 398, 1687, 400, 637,
  397, 639, 396, 623, 420, 623, 420, 1673,
  421, 624, 418, 642, 393, 1677, 394, 1677,
  394, 642, 393, 1000};

#define RAW_DATA_LEN 60
uint16_t rawDataOff[RAW_DATA_LEN]={
  3175, 9980, 455, 1651, 430, 626, 424, 637,
  400, 618, 425, 1649, 430, 627, 424, 626,
  425, 636, 400, 1678, 401, 1660, 426, 644,
  400, 618, 425, 636, 399, 626, 425, 635,
  400, 635, 400, 644, 399, 627, 423, 645,
  398, 638, 397, 639, 395, 1674, 397, 631,
  419, 1684, 395, 650, 393, 642, 394, 642,
  393, 1685, 395, 1000};

#define RAW_DATA_LEN 60
uint16_t rawData23[RAW_DATA_LEN]={
  3092, 9954, 428, 1645, 446, 619, 424, 636,
  399, 645, 399, 1631, 447, 636, 399, 637,
  399, 636, 399, 637, 398, 637, 399, 619,
  424, 637, 399, 1661, 425, 636, 399, 644,
  399, 644, 399, 1652, 427, 636, 398, 637,
  398, 638, 397, 630, 420, 640, 394, 1683,
  396, 625, 418, 624, 419, 641, 394, 1684,
  395, 641, 394, 1000};


#define RAW_DATA_LEN 60
uint16_t rawData24[RAW_DATA_LEN]={
  3066, 9953, 429, 1644, 447, 619, 424, 637,
  398, 645, 399, 1632, 447, 636, 399, 636,
  399, 637, 398, 637, 399, 637, 399, 618,
  424, 637, 399, 1661, 425, 636, 399, 644,
  399, 645, 398, 1678, 401, 636, 398, 638,
```

```
  397, 1680, 399, 630, 420, 631, 419, 1676,
  395, 642, 393, 650, 393, 642, 394, 1684,
  394, 1677, 394, 1000};


#define RAW_DATA_LEN 60
uint16_t rawData25[RAW_DATA_LEN]={
  3095, 9953, 428, 1667, 425, 619, 424, 636,
  399, 645, 399, 1631, 447, 637, 398, 637,
  399, 636, 399, 637, 399, 637, 398, 619,
  424, 637, 399, 1661, 425, 636, 399, 644,
  399, 644, 399, 1679, 400, 636, 398, 1672,
  398, 639, 396, 648, 395, 640, 394, 1684,
  395, 625, 418, 624, 419, 1678, 392, 642,
  394, 642, 393, 1000};

#define RAW_DATA_LEN 60
uint16_t rawDatadry22[RAW_DATA_LEN]={
  3068, 9962, 427, 1635, 448, 644, 400, 626,
  424, 637, 399, 1642, 428, 637, 398, 637,
  399, 636, 399, 644, 399, 637, 399, 618,
  424, 636, 399, 1643, 428, 626, 424, 644,
  399, 1652, 426, 636, 399, 1661, 425, 1661,
  424, 1688, 398, 639, 395, 624, 419, 632,
  418, 650, 393, 649, 394, 650, 394, 624,
  419, 641, 394, 1000};


#define RAW_DATA_LEN 60
uint16_t rawDatadry23[RAW_DATA_LEN]={
  3069, 9954, 428, 1635, 448, 645, 399, 626,
  424, 636, 399, 1643, 428, 636, 399, 636,
  399, 636, 399, 644, 400, 636, 399, 619,
  424, 635, 400, 1643, 428, 626, 424, 644,
  399, 1652, 426, 1653, 426, 619, 424, 627,
  423, 637, 397, 647, 395, 640, 395, 641,
  394, 632, 419, 649, 394, 624, 419, 649,
  394, 1692, 395, 1000};


#define RAW_DATA_LEN 60
uint16_t rawDatadry24[RAW_DATA_LEN]={
  3069, 9961, 427, 1658, 425, 644, 400, 626,
  424, 636, 399, 1642, 429, 636, 399, 636,
  399, 636, 399, 644, 399, 636, 399, 619,
  424, 636, 399, 1643, 428, 626, 424, 644,
  399, 1651, 427, 1652, 427, 619, 423, 627,
```

```
  423, 1672, 398, 629, 421, 623, 420, 623,
  419, 641, 394, 632, 418, 641, 394, 1676,
  395, 641, 394, 1000};

#define RAW_DATA_LEN 60
uint16_t rawDatadry25[RAW_DATA_LEN]={
  3066, 9961, 428, 1637, 446, 644, 399, 630,
  421, 636, 399, 1642, 428, 636, 399, 637,
  398, 636, 399, 645, 399, 636, 399, 619,
  424, 636, 399, 1643, 428, 626, 424, 644,
  399, 1651, 427, 1652, 427, 619, 423, 1661,
  424, 638, 397, 630, 420, 623, 420, 623,
  419, 642, 394, 632, 418, 641, 394, 1676,
  394, 1677, 394, 1000};

void loop() {

    // 시리얼모니터에서 입력 받은 값 비교하여 데이터 송신
    if (Serial.available() > 0){
      char state = Serial.read();

    if (state == 'a'){
    mySender.send(rawDataOn,RAW_DATA_LEN,36);
    Serial.println(F("On"));
      }
      if (state == 'b'){
    mySender.send(rawDataOff,RAW_DATA_LEN,36);
    Serial.println(F("Off"));
      }
      if (state == '3'){
    mySender.send(rawData23,RAW_DATA_LEN,36);
    Serial.println(F("23"));
      }
      if (state == '4'){
    mySender.send(rawData24,RAW_DATA_LEN,36);
    Serial.println(F("24"));
      }
     if (state == '5'){
    mySender.send(rawData25,RAW_DATA_LEN,36);
    Serial.println(F("25"));
      }
     if (state == '6'){
    mySender.send(rawDatadry22,RAW_DATA_LEN,36);
    Serial.println(F("dry22"));
      }
     if (state == '7'){
    mySender.send(rawDatadry23,RAW_DATA_LEN,36);
```

```
      Serial.println(F("dry23"));
        }
       if (state == '8'){
      mySender.send(rawDatadry24,RAW_DATA_LEN,36);
      Serial.println(F("dry24"));
        }
       if (state == '9'){
      mySender.send(rawDatadry25,RAW_DATA_LEN,36);
      Serial.println(F("dry25"));
        }
      }
   delay(5000);
}
```

❍ 릴레이와 220V 상업용 환풍기 연결 조립 및 동작 제어 확인

```
int Relay=12;

void setup(){
pinMode(Relay, OUTPUT);
}

void loop(){
digitalWrite(Relay, HIGH);
delay(1000);
digitalWrite(Relay, LOW);
delay(1000);
}
```

❑ 신정섭이 수행한 내용

❍ 웹 페이지 제작 (코드 설명)

```
<!doctype html>
<html lang="en">

  <head>

    <!-- Required meta tags -->
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
    <meta name="description" content="">
    <meta name="author" content="">

    <title>베이커리 원격제어</title>

    // 버튼 클릭시 확인 alert 창 표시
```

```
    <script language ="javascript">
      function getRadioText(event)  {
      const radioId = event.target.id;
      const query = 'label[for="'+ radioId + '"]'
      const text =
            document.querySelector(query).innerText;

      document.getElementById('result').innerText = text;
    }
    </script>

    <style>
      section {
           background-image: url('img/section.jpg');
           border: 0;
           padding: 0;
           min-height: 100%;
           background-position: center;
           background-size: cover;
      }
      body {
       background-color: #7B1FA2
      }

.container {
    margin-top: 10px;
    margin-bottom: 10px
}

#custCarousel .carousel-indicators {
    position: static;
    margin-top: 20px
}

#custCarousel .carousel-indicators>li {
    width: 100px
}

#custCarousel .carousel-indicators li img {
    display: block;
    opacity: 0.5
}

#custCarousel .carousel-indicators li.active img {
    opacity: 1
}
```

```
#custCarousel .carousel-indicators li:hover img {
    opacity: 0.75
}
    </style>

    // 부트스트랩 파일
    <!-- Bootstrap core CSS -->
    <link href="vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">

    <!-- Custom fonts for this template -->
    <link href="vendor/fontawesome-free/css/all.min.css" rel="stylesheet" type="text/css">
    <link href='https://fonts.googleapis.com/css?family=Open+Sans:300italic,400italic,600italic,700italic,800italic,400,300,600,700,800' rel='stylesheet' type='text/css'>
    <link href='https://fonts.googleapis.com/css?family=Merriweather:400,300,300italic,400italic,700,700italic,900,900italic' rel='stylesheet' type='text/css'>

    <!-- Plugin CSS -->
    <link href="vendor/magnific-popup/magnific-popup.css" rel="stylesheet">

    <!-- Custom styles for this template -->
    <link href="css/creative.min.css" rel="stylesheet">

    <script src="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"></script>
    <script src="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/js/bootstrap.bundle.min.js"></script>
    <script src='https://cdnjs.cloudflare.com/ajax/libs/jquery/3.2.1/jquery.min.js'></script>

  </head>

  <body id="page-top">

    // 네비게이션 상단바
    <nav class="navbar fixed-top navbar-expand-lg navbar-light" id="mainNav">
      <div class="container">
        <a class="navbar-brand page-scroll text-uppercase" href="#page-top"> <strong> Bakery </strong> </a>
        <button class="navbar-toggler navbar-toggler-right" type="button" data-bs-toggle="collapse" data-bs-target="#navbarSupportedContent" aria-controls="navbarSupportedContent" aria-expanded="false" aria-label="Toggle navigation">
          <span class="navbar-toggler-icon"></span>
        </button>
        <div class="collapse navbar-collapse text-uppercase" id="navbarResponsive">
          <ul class="navbar-nav ml-auto">
            <li class="nav-item">
```

```
            <a class="nav-link js-scroll-trigger" href="#home"> <strong> HOME </strong> </a>
          </li>
          <li class="nav-item">
            <a class="nav-link js-scroll-trigger" href="#air"> <strong> 원격제어 </strong> </a>
          </li>
          <li class="nav-item">
            <a class="nav-link js-scroll-trigger" href="#camera"> <strong> 카메라 </strong> </a>
          </li>
        </ul>
      </div>
    </div>
  </nav>

  // 섹션: 첫 번째 페이지
  <!-- Home Section -->
  <header class="masthead text-center text-white d-flex" id="home">
    <div class="container my-auto">
      <div class="row">
        <div class="col-lg-10 mx-auto">
          <h1 class="text-uppercase">
            <strong>나만의 베이커리 원격제어</strong>
          </h1>
        </div>
      </div>
    </div>
  </header>



  // 에어컨 제어 섹션: 두 번째 페이지
  <!-- air Section -->
  <section class="masthead text-center text-white d-flex" id="air" background-image="img/section.jpg">
        <div class="col-lg-3 mx-auto" style="border: 2px solid white; border-radius: 20px; background-color: rgba(0,0,0,0.5);">
          <h1 class="text-uppercase">
            <br>
            <strong>에어컨 제어</strong>
            <hr>
          </h1>
          <br> <br> <br>

        // 에어컨 제어 슬라이드 div
        <!-- carousel를 구성할 영역 설정 -->
        <div class="container">
            <div class="row">
```

```
                <div class="col-md-12">
                    <div id="custCarousel" class="carousel slide" data-interval="false"
align="center">
                        // 첫 번째 슬라이드: LG 제어
                        <!-- slides -->
                        <div class="carousel-inner">
                            <div class="carousel-item active">
                              <font size="2em"> 에어컨 모델: LG </font>
                              <br> <br> <br>
                              <form method='post'>
                                <font size="2em"> 동작 제어 </font>      
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('LG ON')" href="http://192.168.2.2/101">ON</a>
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('LG OFF')" href="http://192.168.2.2/102">OFF</a>
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('LG Dry Mode')" href="http://192.168.2.2/103">Dry mode</a>
                              </form>
                              <br>
                              <form method='post'>
                                <font size="2em"> 온도 제어 </font>      
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('LG 23')" href="http://192.168.2.2/123">23</a>
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('LG 24')"  href="http://192.168.2.2/124">24</a>
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('LG 25')"  href="http://192.168.2.2/125">25</a>
                              <form>
                              <br> <br>
                            </div>
                            // 두 번째 슬라이드: Samsung 제어
                            <div class="carousel-item">
                              <font size="2em"> 에어컨 모델: Samsung </font>
                              <br> <br> <br>
                              <!--<form method='post'>
                                <font size="2em"> 동작 제어 </font>      
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('Samsung ON')" href="http://192.168.2.2/201">ON</a>
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('Samsung OFF')" href="http://192.168.2.2/202">OFF</a>
                                <a class="btn btn-primary js-scroll-trigger"
onclick="javascript:btn('Samsung Dry Mode')" href="http://192.168.2.2/203">Dry mode</a>
                              </form>
                              <br> <br>-->
                              <form method='post'>
                                <font size="2em"> 온도 제어 </font>      
                                <a class="btn btn-primary js-scroll-trigger"
```

```
onclick="javascript:btn('Samsung 23')" href="http://192.168.2.2/223">23</a>
                                    <a          class="btn          btn-primary          js-scroll-trigger"
onclick="javascript:btn('Samsung 24')"  href="http://192.168.2.2/224">24</a>
                                    <a          class="btn          btn-primary          js-scroll-trigger"
onclick="javascript:btn('Samsung 25')"  href="http://192.168.2.2/225">25</a>
                                  <form>
                                  <br> <br>
                                </div>
                                // 세 번째 슬라이드: Carrier 제어
                                <div class="carousel-item">
                                  <font size="2em"> 에어컨 모델: Carrier </font>
                                  <br> <br> <br>
                                  <form method='post'>
                                    <font size="2em"> 동작 제어 </font>      
                                    <a          class="btn          btn-primary          js-scroll-trigger"
onclick="javascript:btn('Carrier ON')" href="http://192.168.2.2/301">ON</a>
                                    <a          class="btn          btn-primary          js-scroll-trigger"
onclick="javascript:btn('Carrier OFF')" href="http://192.168.2.2/302">OFF</a>
                                    <a          class="btn          btn-primary          js-scroll-trigger"
onclick="javascript:btn('Carrier Dry Mode')" href="http://192.168.2.2/303">Dry mode</a>
                                  </form>
                                  <br> <br>
                                  <form method='post'>
                                    <font size="2em"> 온도 제어 </font>      
                                    <a          class="btn          btn-primary          js-scroll-trigger"
onclick="javascript:btn('Carrier 23')" href="http://192.168.2.2/323">23</a>
                                    <a          class="btn          btn-primary          js-scroll-trigger"
onclick="javascript:btn('Carrier 24')"  href="http://192.168.2.2/324">24</a>
                                    <a          class="btn          btn-primary          js-scroll-trigger"
onclick="javascript:btn('Carrier 25')"  href="http://192.168.2.2/325">25</a>
                                  <form>
                                  <br> <br>
                                </div>
                            </div>  <!--  Left  right  -->  <a  class="carousel-control-prev"
href="#custCarousel" data-slide="prev"> <span class="carousel-control-prev-icon"></span> </a> <a
class="carousel-control-next"          href="#custCarousel"          data-slide="next">          <span
class="carousel-control-next-icon"></span> </a> <!-- Thumbnails -->
                            <ol class="carousel-indicators list-inline">
                                <li  class="list-inline-item  active">  <a  id="carousel-selector-0"
class="selected" data-slide-to="0" data-target="#custCarousel"> <br> <button class="img-fluid btn
btn-primary">LG</button> </a> </li>
                                <li       class="list-inline-item">       <a       id="carousel-selector-1"
data-slide-to="1"     data-target="#custCarousel">     <br>     <button     class="img-fluid     btn
btn-primary">Samsung</button> </a> </li>
                                <li       class="list-inline-item">       <a       id="carousel-selector-2"
data-slide-to="2"     data-target="#custCarousel">     <br>     <button     class="img-fluid     btn
btn-primary">Carrier</button> </a> </li>
```

```
                        </ol>
                    </div>
                </div>
            </div>
          </div>
          </div>
        </div>

          // 환풍기 제어 섹션: 두 번째 페이지
          <div class="col-lg-3 mx-auto" style="border: 2px solid white; border-radius: 20px; background-color: rgba(0,0,0,0.5);">
            <h1 class="text-uppercase">
              <br>
              <strong>환풍기 제어</strong>
              <hr>
            </h1>
            <br> <br> <br> <br> <br> <br>

            <table class="table table-borderless">
              <tbody>
                <tr>
                  <td style="border-top: none;">
                    <form method='post'>
                      <font size="2em"> 환풍기 제어 </font>      
                      <a class="btn btn-primary js-scroll-trigger" onclick="javascript:btn('환풍기 ON')" href="http://192.168.2.2/401">ON</a>
                      <a class="btn btn-primary js-scroll-trigger" onclick="javascript:btn('환풍기 OFF')" href="http://192.168.2.2/402">OFF</a>
                    </form>
                    <br>
                  </td>
                </tr>
              </tbody>
              </table>
          </div>
          // 오븐 제어 섹션: 두 번째 페이지
          <!--
          <div class="col-lg-3 mx-auto bgGreyDark2" style="border: 2px solid white; border-radius: 20px; background-color: rgba(0,0,0,0.5);">
            <h1 class="text-uppercase">
              <br>
              <strong>오븐 제어</strong>
              <hr>
            </h1>
            <br> <br> <br> <br> <br> <br>

            <table class="table table-borderless">
```

```
            <tbody>
              <tr>
                <th style="border-top: none;" scope="row"> <br> <h2 class="text-uppercase"> 오븐 작동 </h2> </th>
                <td style="border-top: none;">
                  <form method='post'>
                    <br>
                    <a class="btn btn-primary js-scroll-trigger" onclick="javascript:btn('LG Dry Mode')" href="http://192.168.2.2/501">ON</a>
                    <a class="btn btn-primary js-scroll-trigger" onclick="javascript:btn('LG Dry Mode')" href="http://192.168.2.2/502">OFF</a>
                  </form>
                  <br>
                </td>
              </tr>
            </tbody>
            </table>
        </div>
      -->

  </section>

  // 웹 카메라 출력 섹션: 세 번째 페이지
  <!-- camera Section -->
  <section class="masthead text-center text-white d-flex" id="camera">
    <div class="col-lg-10 mx-auto" style="border: 2px solid white; border-radius: 20px; background-color: rgba(0,0,0,0.5);">
      <h1 class="text-uppercase">
        <br>
        <strong>동작 화면</strong>
        <hr>
      </h1>
        <div class="col-lg-5 mx-auto" style="margin-bottom: 10px;">
          <img src="http://192.168.2.12:81/stream" width="500px" height="500px">
          <br>
        </div>
    </div>
  </section>

  // 부트스트랩 자바 소스 링크
  <!-- Bootstrap core JavaScript -->
  <script src="vendor/jquery/jquery.min.js"></script>
  <script src="vendor/bootstrap/js/bootstrap.bundle.min.js"></script>

  <!-- Plugin JavaScript -->
  <script src="vendor/jquery-easing/jquery.easing.min.js"></script>
  <script src="vendor/scrollreveal/scrollreveal.min.js"></script>
```

```
    <script src="vendor/magnific-popup/jquery.magnific-popup.min.js"></script>

    <!-- Custom scripts for this template -->
    <script src="js/creative.min.js"></script>

  </body>
</html>
```

❍ Arduino 최종 코드 수정 및 종합 (코드 설명)

```
#include "WiFiEsp.h"            // Esp 헤더파일
#include "Relay.h"              // Relay 헤더파일
#include <IRLibSendBase.h>     // 송신모듈 헤더파일
#include <IRLib_HashRaw.h>     // 송신모듈 Raw_Data

IRsendRaw mySender;            // 송신모듈 선언

#ifndef HAVE_HWSERIAL1
#include "SoftwareSerial.h"
SoftwareSerial Serial1(4, 5); // RX, TX
#endif

char ssid[] = "belkin.cd8";        // your network SSID (name)
char pass[] = "9a9a86b2";          // your network password
int status = WL_IDLE_STATUS;      // the Wifi radio's status
int reqCount = 0;                  // number of requests received

int command  = 0;

int Relay = 12;                      // 릴레이

WiFiEspServer server(80);

// LG 에어컨 제어 코드
#define RAW_DATA_LEN_LG 60
uint16_t rawDataLGOn[RAW_DATA_LEN_LG] ={
   3069, 9975, 445, 1659, 424, 645, 399, 636,
   399, 637, 398, 1643, 428, 637, 398, 637,
   398, 645, 399, 644, 399, 637, 398, 645,
   399, 619, 424, 644, 399, 636, 400, 644,
   399, 627, 424, 636, 398, 1687, 400, 637,
   397, 639, 396, 623, 420, 623, 420, 1673,
   421, 624, 418, 642, 393, 1677, 394, 1677,
   394, 642, 393, 1000};

uint16_t rawDataLGOff[RAW_DATA_LEN_LG] ={
   3175, 9980, 455, 1651, 430, 626, 424, 637,
```

```
    400, 618, 425, 1649, 430, 627, 424, 626,
    425, 636, 400, 1678, 401, 1660, 426, 644,
    400, 618, 425, 636, 399, 626, 425, 635,
    400, 635, 400, 644, 399, 627, 423, 645,
    398, 638, 397, 639, 395, 1674, 397, 631,
    419, 1684, 395, 650, 393, 642, 394, 642,
    393, 1685, 395, 1000};

uint16_t rawDataLGDry[RAW_DATA_LEN_LG] ={
    3069, 9983, 400, 1657, 425, 645, 399, 626,
    424, 637, 399, 1670, 400, 636, 399, 637,
    398, 637, 398, 645, 398, 637, 399, 618,
    425, 636, 399, 1670, 400, 627, 424, 644,
    399, 1677, 401, 636, 399, 1661, 425, 627,
    422, 1672, 398, 630, 421, 623, 419, 624,
    418, 667, 369, 1666, 420, 1676, 395, 1665,
    420, 643, 393, 1000};

uint16_t rawDataLG23[RAW_DATA_LEN_LG] ={
    3092, 9954, 428, 1645, 446, 619, 424, 636,
    399, 645, 399, 1631, 447, 636, 399, 637,
    399, 636, 399, 637, 398, 637, 399, 619,
    424, 637, 399, 1661, 425, 636, 399, 644,
    399, 644, 399, 1652, 427, 636, 398, 637,
    398, 638, 397, 630, 420, 640, 394, 1683,
    396, 625, 418, 624, 419, 641, 394, 1684,
    395, 641, 394, 1000};

uint16_t rawDataLG24[RAW_DATA_LEN_LG] ={
    3066, 9953, 429, 1644, 447, 619, 424, 637,
    398, 645, 399, 1632, 447, 636, 399, 636,
    399, 637, 398, 637, 399, 637, 399, 618,
    424, 637, 399, 1661, 425, 636, 399, 644,
    399, 645, 398, 1678, 401, 636, 398, 638,
    397, 1680, 399, 630, 420, 631, 419, 1676,
    395, 642, 393, 650, 393, 642, 394, 1684,
    394, 1677, 394, 1000};

uint16_t rawDataLG25[RAW_DATA_LEN_LG] ={
    3095, 9953, 428, 1667, 425, 619, 424, 636,
    399, 645, 399, 1631, 447, 637, 398, 637,
    399, 636, 399, 637, 399, 637, 398, 619,
    424, 637, 399, 1661, 425, 636, 399, 644,
    399, 644, 399, 1679, 400, 636, 398, 1672,
    398, 639, 396, 648, 395, 640, 394, 1684,
    395, 625, 418, 624, 419, 1678, 392, 642,
    394, 642, 393, 1000};
```

```
// Samsung 에어컨 제어 코드
#define RAW_DATA_LEN_S1 234
#define RAW_DATA_LEN_S2 130

/*const uint16_t rawDataSOn[RAW_DATA_LEN_S1] PROGMEM ={
  404, 616, 379, 642, 354, 1612, 378, 1612,
  404, 1586, 404, 1586, 405, 3092, 2879, 9084,
  380, 1610, 380, 615, 380, 591, 404, 590,
  405, 590, 405, 591, 404, 592, 403, 642,
  353, 642, 353, 1637, 378, 617, 379, 616,
  379, 616, 380, 1610, 380, 1610, 380, 615,
  380, 1610, 379, 1586, 405, 1585, 405, 1586,
  404, 616, 379, 642, 353, 642, 353, 642,
  378, 617, 378, 618, 378, 617, 379, 616,
  380, 615, 380, 615, 380, 615, 380, 616,
  379, 616, 379, 616, 379, 591, 404, 591,
  404, 591, 404, 592, 403, 617, 378, 1639,
  351, 1638, 377, 618, 378, 617, 379, 616,
  380, 1611, 379, 615, 380, 616, 379, 616,
  379, 616, 379, 616, 379, 615, 380, 592,
  404, 1611, 379, 1638, 352, 1638, 352, 1638,
  379, 1000};

const uint16_t rawDataSOff[RAW_DATA_LEN_S1] PROGMEM ={
  404, 616, 379, 642, 354, 1612, 378, 1612,
  404, 1586, 404, 1586, 405, 3092, 2879, 9084,
  380, 1610, 380, 615, 380, 591, 404, 590,
  405, 590, 405, 591, 404, 592, 403, 642,
  353, 642, 353, 1637, 378, 617, 379, 616,
  379, 616, 380, 1610, 380, 1610, 380, 615,
  380, 1610, 379, 1586, 405, 1585, 405, 1586,
  404, 616, 379, 642, 353, 642, 353, 642,
  378, 617, 378, 618, 378, 617, 379, 616,
  380, 615, 380, 615, 380, 615, 380, 616,
  379, 616, 379, 616, 379, 591, 404, 591,
  404, 591, 404, 592, 403, 617, 378, 1639,
  351, 1638, 377, 618, 378, 617, 379, 616,
  380, 1611, 379, 615, 380, 616, 379, 616,
  379, 616, 379, 616, 379, 615, 380, 592,
  404, 1611, 379, 1638, 352, 1638, 352, 1638,
  379, 1000};

const uint16_t rawDataSDry[RAW_DATA_LEN_S1] PROGMEM ={
  404, 616, 379, 642, 354, 1612, 378, 1612,
  404, 1586, 404, 1586, 405, 3092, 2879, 9084,
  380, 1610, 380, 615, 380, 591, 404, 590,
```

```
  405, 590, 405, 591, 404, 592, 403, 642,
  353, 642, 353, 1637, 378, 617, 379, 616,
  379, 616, 380, 1610, 380, 1610, 380, 615,
  380, 1610, 379, 1586, 405, 1585, 405, 1586,
  404, 616, 379, 642, 353, 642, 353, 642,
  378, 617, 378, 618, 378, 617, 379, 616,
  380, 615, 380, 615, 380, 615, 380, 616,
  379, 616, 379, 616, 379, 591, 404, 591,
  404, 591, 404, 592, 403, 617, 378, 1639,
  351, 1638, 377, 618, 378, 617, 379, 616,
  380, 1611, 379, 615, 380, 616, 379, 616,
  379, 616, 379, 616, 379, 615, 380, 592,
  404, 1611, 379, 1638, 352, 1638, 352, 1638,
  379, 1000};*/

const uint16_t rawDataS23[RAW_DATA_LEN_S1] PROGMEM ={
  498, 18016, 2913, 9054, 408, 615, 380, 1582,
  408, 615, 380, 615, 379, 616, 380, 614,
  381, 614, 381, 615, 380, 591, 404, 1584,
  406, 590, 405, 590, 405, 1611, 379, 642,
  353, 642, 353, 1611, 405, 1585, 406, 1585,
  405, 1585, 406, 1584, 406, 615, 380, 615,
  380, 590, 405, 590, 405, 590, 405, 590,
  405, 615, 380, 642, 353, 642, 353, 642,
  353, 642, 378, 617, 379, 616, 380, 615,
  380, 615, 380, 615, 380, 618, 377, 615,
  380, 615, 380, 591, 405, 590, 405, 590,
  405, 590, 405, 591, 404, 615, 380, 642,
  353, 642, 353, 642, 353, 642, 378, 617,
  379, 616, 379, 616, 380, 1585, 405, 1585,
  405, 1585, 405, 1584, 406, 3091, 2880, 9060,
  405, 1585, 405, 642, 353, 642, 353, 642,
  353, 642, 377, 618, 378, 617, 379, 616,
  380, 615, 380, 1610, 380, 615, 380, 615,
  380, 615, 380, 615, 380, 1585, 405, 590,
  405, 1586, 404, 1637, 353, 1637, 353, 1637,
  378, 617, 379, 616, 379, 616, 380, 615,
  380, 615, 380, 615, 380, 615, 380, 615,
  380, 591, 404, 591, 404, 590, 405, 591,
  404, 591, 405, 642, 352, 643, 353, 642,
  352, 1638, 377, 1613, 378, 1612, 379, 616,
  379, 1611, 379, 616, 379, 616, 379, 616,
  379, 1586, 404, 591, 405, 591, 403, 616,
  380, 642, 353, 642, 353, 642, 353, 643,
  377, 1613, 378, 1612, 379, 1610, 380, 1611,
  379, 1000};
```

```
const uint16_t rawDataS24[RAW_DATA_LEN_S2] PROGMEM ={
  404, 616, 379, 642, 354, 1612, 378, 1612,
  404, 1586, 404, 1586, 405, 3092, 2879, 9084,
  380, 1610, 380, 615, 380, 591, 404, 590,
  405, 590, 405, 591, 404, 592, 403, 642,
  353, 642, 353, 1637, 378, 617, 379, 616,
  379, 616, 380, 1610, 380, 1610, 380, 615,
  380, 1610, 379, 1586, 405, 1585, 405, 1586,
  404, 616, 379, 642, 353, 642, 353, 642,
  378, 617, 378, 618, 378, 617, 379, 616,
  380, 615, 380, 615, 380, 615, 380, 616,
  379, 616, 379, 616, 379, 591, 404, 591,
  404, 591, 404, 592, 403, 617, 378, 1639,
  351, 1638, 377, 618, 378, 617, 379, 616,
  380, 1611, 379, 615, 380, 616, 379, 616,
  379, 616, 379, 616, 379, 615, 380, 592,
  404, 1611, 379, 1638, 352, 1638, 352, 1638,
  379, 1000};

const uint16_t rawDataS25[RAW_DATA_LEN_S1] PROGMEM ={
  498, 18007, 2887, 9053, 411, 587, 407, 1581,
  408, 641, 353, 642, 353, 642, 378, 617,
  378, 617, 379, 616, 380, 615, 381, 1584,
  406, 615, 380, 615, 380, 1584, 406, 615,
  380, 590, 405, 1585, 406, 1584, 406, 1611,
  379, 1611, 402, 1588, 405, 616, 379, 616,
  380, 615, 380, 615, 380, 615, 380, 615,
  380, 615, 380, 615, 380, 591, 404, 590,
  405, 591, 405, 590, 405, 591, 404, 644,
  351, 642, 353, 642, 377, 618, 378, 617,
  379, 616, 380, 615, 380, 616, 380, 615,
  380, 615, 380, 615, 380, 615, 380, 615,
  380, 591, 404, 590, 405, 591, 404, 591,
  405, 591, 404, 642, 353, 1612, 378, 1612,
  403, 1587, 404, 1586, 405, 3091, 2880, 9061,
  404, 1610, 381, 615, 380, 615, 380, 590,
  405, 590, 405, 590, 405, 591, 404, 615,
  380, 642, 353, 1637, 352, 643, 377, 618,
  378, 1612, 379, 616, 380, 1610, 380, 615,
  380, 1610, 380, 1585, 405, 1586, 404, 1586,
  404, 592, 404, 642, 353, 642, 353, 642,
  353, 642, 377, 618, 379, 616, 379, 616,
  380, 616, 379, 616, 379, 616, 379, 616,
  380, 615, 380, 615, 380, 590, 405, 590,
  405, 1585, 405, 591, 404, 642, 353, 1637,
  353, 1638, 377, 618, 378, 617, 379, 616,
  379, 1611, 379, 616, 379, 616, 380, 615,
```

```
  380, 615, 379, 591, 405, 590, 405, 591,
  404, 1610, 380, 1637, 352, 1638, 353, 1637,
  379, 1000};

// Carrier 에어컨 제어 코드
const uint16_t rawDataCOn[RAW_DATA_LEN_S1] PROGMEM ={
  4321, 4511, 456, 1699, 456, 625, 452, 1699,
457, 1699, 457, 649, 428, 649, 429, 1699,
457, 649, 428, 650, 428, 1699, 457, 649,
433, 645, 428, 1700, 455, 1701, 455, 649,
428, 1701, 454, 1702, 475, 629, 448, 1706,
450, 1706, 448, 1708, 448, 1708, 447, 1708,
447, 1708, 448, 631, 447, 1707, 448, 630,
447, 631, 447, 631, 447, 630, 447, 631,
447, 631, 447, 630, 447, 1708, 448, 1708,
447, 631, 447, 631, 447, 630, 448, 630,
447, 631, 447, 1708, 448, 630, 447, 631,
447, 1707, 448, 1708, 447, 1708, 447, 1709,
447, 1708, 447, 5309, 4312, 4520, 447, 1709,
447, 631, 447, 1708, 447, 1709, 447, 631,
447, 630, 447, 1708, 448, 630, 447, 631,
447, 1708, 447, 631, 447, 631, 446, 1708,
448, 1708, 447, 631, 447, 1708, 447, 1708,
447, 631, 447, 1709, 446, 1709, 447, 1709,
446, 1709, 447, 1708, 447, 1709, 447, 631,
447, 1708, 447, 631, 447, 631, 447, 631,
446, 631, 447, 631, 447, 630, 447, 631,
447, 1709, 447, 1708, 447, 631, 447, 631,
447, 631, 446, 631, 447, 631, 447, 1709,
446, 632, 446, 631, 447, 1709, 446, 1709,
447, 1709, 446, 1709, 447, 1709, 447, 1000};

const uint16_t rawDataCOff[RAW_DATA_LEN_S1] PROGMEM ={
  4323, 4538, 429, 1726, 429, 650, 428, 1726,
430, 1726, 429, 650, 428, 650, 428, 1725,
430, 650, 428, 649, 428, 1699, 457, 649,
428, 649, 428, 1726, 430, 1725, 430, 649,
428, 1726, 429, 651, 427, 1727, 451, 1705,
450, 1706, 449, 1706, 449, 656, 422, 1708,
448, 1708, 448, 1708, 447, 656, 422, 632,
446, 632, 446, 631, 447, 1708, 448, 632,
446, 631, 446, 1708, 447, 1709, 447, 1709,
448, 655, 422, 632, 446, 632, 446, 632,
446, 632, 446, 632, 446, 631, 446, 632,
446, 1708, 447, 1708, 448, 1708, 448, 1708,
447, 1709, 447, 5310, 4313, 4520, 447, 1708,
447, 632, 446, 1709, 447, 1708, 447, 632,
```

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446, 631, 447, 1709, 446, 632, 446, 632,
446, 1709, 446, 632, 446, 632, 446, 1709,
446, 1710, 446, 632, 445, 1711, 445, 656,
422, 1733, 422, 1734, 422, 1734, 422, 1734,
421, 657, 421, 1734, 422, 1734, 421, 1734,
422, 656, 421, 657, 421, 656, 422, 656,
422, 1734, 421, 657, 421, 657, 421, 1735,
421, 1735, 421, 1734, 421, 657, 421, 656,
422, 656, 422, 656, 421, 657, 421, 657,
421, 657, 421, 656, 421, 1735, 421, 1734,
421, 1735, 421, 1735, 421, 1735, 421, 1000};

const uint16_t rawDataCDry[RAW_DATA_LEN_S1] PROGMEM ={
  4325, 4510, 456, 1696, 459, 650, 428, 1697,
458, 1726, 429, 650, 428, 650, 428, 1726,
429, 650, 428, 649, 428, 1726, 429, 650,
428, 649, 428, 1726, 430, 1725, 430, 649,
428, 1726, 429, 650, 449, 629, 448, 630,
447, 1706, 450, 1706, 448, 1708, 447, 1709,
447, 1708, 448, 1708, 447, 1707, 448, 1708,
447, 632, 445, 656, 422, 656, 422, 632,
445, 632, 446, 632, 445, 633, 445, 1708,
447, 656, 422, 632, 445, 1708, 447, 656,
422, 631, 446, 1709, 447, 1708, 447, 632,
445, 1709, 447, 1708, 447, 632, 446, 1709,
446, 1709, 447, 5310, 4312, 4520, 446, 1709,
446, 632, 446, 1709, 446, 1709, 446, 632,
448, 630, 445, 1709, 446, 632, 446, 632,
446, 1709, 446, 632, 445, 633, 445, 1709,
446, 1710, 446, 632, 445, 1710, 445, 656,
422, 632, 445, 633, 446, 1709, 445, 1710,
446, 1710, 445, 1710, 445, 1710, 446, 1733,
422, 1710, 445, 1734, 421, 657, 421, 657,
421, 656, 421, 657, 421, 657, 421, 656,
422, 656, 421, 1734, 422, 656, 421, 657,
421, 1734, 421, 657, 421, 657, 421, 1734,
421, 1734, 421, 657, 421, 1735, 420, 1734,
422, 656, 421, 1735, 421, 1734, 421, 1000};

const uint16_t rawDataC23[RAW_DATA_LEN_S1] PROGMEM ={
  4322, 4511, 455, 1700, 456, 624, 453, 1699,
457, 1699, 457, 649, 429, 649, 428, 1699,
457, 649, 428, 650, 428, 1699, 456, 650,
428, 649, 428, 1700, 455, 1700, 456, 649,
428, 1701, 454, 1703, 452, 651, 449, 1706,
449, 1707, 449, 1707, 448, 1707, 448, 1708,
448, 1707, 448, 630, 448, 1708, 447, 631,
```

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447, 631, 447, 630, 448, 630, 447, 631,
447, 630, 447, 631, 447, 1708, 448, 630,
447, 1708, 448, 630, 448, 630, 447, 631,
447, 631, 447, 1708, 447, 631, 447, 1708,
447, 631, 447, 1708, 448, 1708, 447, 1709,
447, 1708, 447, 5310, 4313, 4519, 447, 1708,
447, 631, 447, 1708, 448, 1708, 447, 631,
447, 631, 447, 1709, 447, 631, 447, 631,
447, 1708, 447, 630, 448, 630, 448, 1708,
447, 1709, 447, 631, 447, 1708, 447, 1708,
447, 631, 447, 1708, 447, 1708, 447, 1709,
446, 1709, 446, 1709, 447, 1708, 447, 631,
447, 1709, 446, 631, 447, 631, 447, 631,
446, 631, 447, 631, 447, 631, 446, 631,
447, 1709, 447, 631, 446, 1709, 446, 631,
447, 631, 446, 631, 447, 631, 447, 1709,
447, 631, 446, 1709, 446, 632, 446, 1709,
447, 1709, 446, 1710, 446, 1709, 446, 1000};

const uint16_t rawDataC24[RAW_DATA_LEN_S1] PROGMEM ={
  4320, 4511, 456, 1699, 456, 624, 454, 1699,
456, 1699, 457, 650, 428, 649, 428, 1699,
457, 650, 428, 649, 429, 1698, 457, 649,
429, 649, 428, 1700, 456, 1700, 455, 649,
428, 1701, 477, 1679, 452, 652, 449, 1682,
473, 1706, 449, 1706, 448, 1708, 447, 1708,
448, 1707, 448, 631, 447, 1708, 447, 631,
447, 631, 447, 630, 447, 631, 447, 631,
447, 630, 447, 631, 447, 1708, 447, 631,
447, 630, 447, 631, 447, 631, 447, 630,
448, 630, 447, 1708, 448, 630, 448, 1707,
447, 1709, 447, 1708, 447, 1709, 447, 1708,
448, 1708, 447, 5309, 4313, 4519, 448, 1708,
447, 631, 447, 1708, 447, 1708, 448, 630,
448, 630, 448, 1707, 448, 630, 447, 631,
447, 1708, 447, 631, 447, 631, 447, 1708,
448, 1708, 447, 631, 447, 1708, 447, 1708,
448, 630, 448, 1708, 447, 1708, 447, 1709,
447, 1708, 447, 1709, 446, 1709, 446, 631,
447, 1708, 447, 631, 447, 631, 447, 631,
446, 631, 447, 631, 447, 631, 447, 631,
447, 1708, 447, 631, 447, 631, 447, 630,
447, 631, 447, 631, 447, 630, 447, 1709,
446, 1709, 446, 1709, 447, 1714, 441, 1000};

const uint16_t rawDataC25[RAW_DATA_LEN_S1] PROGMEM ={
  4372, 4459, 508, 1648, 480, 626, 451, 1675,
```

```
481, 1675, 480, 625, 453, 625, 479, 1649,
507, 598, 479, 599, 452, 1678, 478, 625,
452, 626, 452, 1677, 479, 1677, 484, 620,
451, 1679, 477, 1680, 475, 628, 450, 1704,
450, 1706, 449, 1707, 449, 1707, 448, 1708,
448, 1707, 448, 630, 448, 1708, 448, 630,
448, 630, 448, 629, 448, 630, 448, 630,
448, 630, 448, 1707, 448, 1708, 448, 630,
448, 629, 448, 630, 448, 630, 448, 630,
448, 629, 448, 631, 447, 630, 448, 1708,
448, 1708, 447, 1713, 443, 1708, 447, 1709,
447, 1708, 448, 5310, 4314, 4520, 447, 1709,
447, 631, 446, 1709, 447, 1709, 446, 632,
446, 632, 446, 1709, 447, 631, 447, 631,
447, 1709, 447, 631, 447, 631, 447, 1709,
446, 1709, 447, 631, 447, 1709, 446, 1710,
446, 632, 446, 1710, 446, 1709, 447, 1709,
447, 1709, 446, 1710, 446, 1709, 447, 631,
447, 1709, 446, 632, 446, 632, 446, 631,
446, 632, 446, 632, 446, 632, 446, 1710,
445, 1710, 446, 632, 446, 632, 445, 632,
446, 632, 446, 632, 446, 632, 445, 632,
446, 632, 446, 1709, 446, 1710, 445, 1710,
446, 1710, 446, 1710, 446, 1710, 445, 1000};

void setup()
{
  // initialize serial for debugging
  Serial.begin(9600);
  // initialize serial for ESP module
  Serial1.begin(9600);
  // initialize ESP module
  WiFi.init(&Serial1);

  // check for the presence of the shield
  if (WiFi.status() == WL_NO_SHIELD) {
    Serial.println("WiFi shield not present");
    // don't continue
    while (true);
  }

  // attempt to connect to WiFi network
  while ( status != WL_CONNECTED) {
    Serial.print("Attempting to connect to WPA SSID: ");
    Serial.println(ssid);
    // Connect to WPA/WPA2 network
    status = WiFi.begin(ssid, pass);
```

```
  }

  Serial.println("You're connected to the network");
  printWifiStatus();

  // start the web server on port 80
  server.begin();

  pinMode(Relay, OUTPUT);              // Relay 모듈
}

void loop()
{
  int index1, index2;

  // listen for incoming clients
  WiFiEspClient client = server.available();
  if (client) {
    Serial.println("New client");
    // an http request ends with a blank line
    boolean currentLineIsBlank = true;

    String message="";

    while (client.connected()) {
      if (client.available()) {
        char c = client.read();            // c = GET /101 HTTP/1.1이 출력된다.
        Serial.write(c);                   // 여기서 '101'만 뽑아와서 비교해야한다.
        message += c;

        // if you've gotten to the end of the line (received a newline
        // character) and the line is blank, the http request has ended,
        // so you can send a reply
        if (c == '\n' && currentLineIsBlank) {
          index1 = message.indexOf('/');                    // 문자열 파싱 /부터
          index2 = message.indexOf('H', index1+1);          // H까지

          command = message.substring(index1+1,index2-1).toInt();       // /부터 H -1까지
    //    Serial.println(message);
          message="";
          Serial.println(command);                          // /부터 H -1까지의 값을 출력하라

          // LG 코드
          if ( command == 101 ) {
            mySender.send(rawDataLGOn,RAW_DATA_LEN_LG,36);    //Pass the buffer,length,
optionally frequency
            Serial.println(F("On"));
```

```
        }

        else if ( command == 102 ) {
          mySender.send(rawDataLGOff,RAW_DATA_LEN_LG,36);    //Pass    the    buffer,length,
optionally frequency
          Serial.println(F("Off"));
        }

        else if ( command == 103 ) {
          mySender.send(rawDataLGDry,RAW_DATA_LEN_LG,36);    //Pass    the    buffer,length,
optionally frequency
          Serial.println(F("Dry"));
        }

        else if ( command == 123 ) {
          mySender.send(rawDataLG23,RAW_DATA_LEN_LG,36);    //Pass    the    buffer,length,
optionally frequency
          Serial.println(F("23도_LG"));
        }

        else if ( command == 124 ) {
          mySender.send(rawDataLG24,RAW_DATA_LEN_LG,36);    //Pass    the    buffer,length,
optionally frequency
          Serial.println(F("24도_LG"));
        }

        else if ( command == 125 ) {
          mySender.send(rawDataLG25,RAW_DATA_LEN_LG,36);    //Pass    the    buffer,length,
optionally frequency
          Serial.println(F("25도_LG"));
        }

        // Samsung 코드
        /*else if ( command == 201 ) {
          mySender.send(rawDataSOn,RAW_DATA_LEN_S1,36);    //Pass    the    buffer,length,
optionally frequency
          Serial.println(F("On"));
        }

        else if ( command == 202 ) {
          mySender.send(rawDataSOff,RAW_DATA_LEN_S1,36);    //Pass    the    buffer,length,
optionally frequency
          Serial.println(F("Off"));
        }

        else if ( command == 203 ) {
          mySender.send(rawDataSDry,RAW_DATA_LEN_S1,36);    //Pass    the    buffer,length,
```

```
optionally frequency
            Serial.println(F("Dry"));
          }*/

          else if ( command == 223 ) {
            mySender.send(rawDataS23,RAW_DATA_LEN_S1,36);      //Pass      the      buffer,length,
optionally frequency
            Serial.println(F("23도_S"));
          }

          else if ( command == 224 ) {
            mySender.send(rawDataS24,RAW_DATA_LEN_S2,36);      //Pass      the      buffer,length,
optionally frequency
            Serial.println(F("24도_S"));
          }

          else if ( command == 225 ) {
            mySender.send(rawDataS25,RAW_DATA_LEN_S1,36);      //Pass      the      buffer,length,
optionally frequency
            Serial.println(F("25도_S"));
          }

          // Carrier 코드
          else if ( command == 301 ) {
            mySender.send(rawDataCOn,RAW_DATA_LEN_S1,36);      //Pass      the      buffer,length,
optionally frequency
            Serial.println(F("On"));
          }

          else if ( command == 302 ) {
            mySender.send(rawDataCOff,RAW_DATA_LEN_S1,36);      //Pass      the      buffer,length,
optionally frequency
            Serial.println(F("Off"));
          }

          else if ( command == 303 ) {
            mySender.send(rawDataCDry,RAW_DATA_LEN_S1,36);      //Pass      the      buffer,length,
optionally frequency
            Serial.println(F("Dry"));
          }

          else if ( command == 323 ) {
            mySender.send(rawDataC23,RAW_DATA_LEN_S1,36);      //Pass      the      buffer,length,
optionally frequency
            Serial.println(F("23도_C"));
          }
```

```
            else if ( command == 324 ) {
              mySender.send(rawDataC24,RAW_DATA_LEN_S1,36);     //Pass     the     buffer,length,
optionally frequency
              Serial.println(F("24도_C"));
            }

            else if ( command == 325 ) {
              mySender.send(rawDataC25,RAW_DATA_LEN_S1,36);     //Pass     the     buffer,length,
optionally frequency
              Serial.println(F("25도_C"));
            }

            // 환풍기 제어 코드
            else if ( command == 401 ) {
              digitalWrite(Relay, HIGH);
              Serial.println(F("환풍기 On"));
            }

            else if ( command == 402 ) {
              digitalWrite(Relay, LOW);
              Serial.println(F("환풍기 Off"));
            }

            else {
            client.stop();
            Serial.println("Client disconnected");
            return;
            }

          }
          if (c == '\n') {
            // you're starting a new line
            currentLineIsBlank = true;
          }/*
          else if (c != '\r') {
            // you've gotten a character on the current line
            currentLineIsBlank = false;
          }*/
        }
      }

      client.flush();
      // give the web browser time to receive the data
      delay(10);

      // close the connection:
      Serial.println("Client disconnected");
```

```
  }
}

void printWifiStatus()
{
  // print the SSID of the network you're attached to
  Serial.print("SSID: ");
  Serial.println(WiFi.SSID());

  // print your WiFi shield's IP address
  IPAddress ip = WiFi.localIP();
  Serial.print("IP Address: ");
  Serial.println(ip);

  // print where to go in the browser
  Serial.println();
  Serial.print("To see this page in action, open a browser to http://");
  Serial.println(ip);
  Serial.println();
}
```